

COMMERCIAL FISHERIES ABSTRACTS

C. F. T. R. I.
FISH TECHNOLOGY EXPERIMENT STATION,
Hoige Bazaar, MANGALORE-I.

UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES



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A description of the numbering system is contained in FISHERY LEAFLET No. 232: "FISHERY TECHNOLOGICAL ABSTRACT CARD SYSTEM," by Maurice E. Stansby, K. L. Osterhaug, and F. Bruce Sanford. The Leaflet is obtainable free from this Bureau.

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BUGWATCHING BY COMPUTER

Davenport, Demorest (Zoology Department, University of California, Santa Barbara)
New Scientist 42, No. 655, 692-693 (June 26, 1969)

In the investigation of motile behavior in microorganisms, one needs to observe and at the same time to record quantitatively the movements of individual cells in an open, unrestricted preparation. He needs to be able to change at will the conditions--for example, the illumination, salinity, temperature, or concentration of chemical agents--in the preparation during an experiment without restricting the free movement of the microorganisms. And in some investigations, he needs to be able to record simultaneously the movements of a number of individual cells as distinct entities in a mass of cells. The author has developed a computerized apparatus for satisfying these requirements.

The basic optical element is an inverted microscope with all magnifications from 20X to oil, with phase contrast and dark field. The illuminator is far enough from the stage to mitigate the effects of heat, and the large, open stage with objectives below provides maximum freedom for manipulation of a free, open preparation. Thus a veritable aquarium of microorganisms can be put on the stage and focussed upon with either a low-power or a long-focus, high-dry lens.

The electronic elements consist of a TV camera with camera control and monitors and a video tape recorder. The camera looks at the optical image directly (over)

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: L. Baldwin

LOW OXYGEN: BACK ON MENU

(0.8)

Anonymous
Chemical Week 105, No. 4, 28 (July 26, 1969)

Description.--Because of the advent of new systems for achieving and maintaining desired low oxygen levels, interest in using a controlled-oxygen atmosphere for preserving foods has been rekindled.

The manufacturer of the newest system uses fixed-location equipment to draw air in from the storage area, remove most of the oxygen and carbon dioxide, and return it to the cold room, where the combination of cold and low oxygen keeps oxidation and decomposition at a minimum. The system has two components: an oxygen converter and a carbon-dioxide scrubber. The converter uses a special catalyst to combine propane (from 1 to 2 pounds per hour) with oxygen; most of the heat of the reaction is removed by a direct water spray installed in the converter. The scrubber consists of two sets of molecular sieves through which the air treated by the converter passes. One set of sieves removes carbon dioxide and trace contaminants from the air while the other set, the one not in use, is heated to between 350° and 400° F. to drive off adsorbed gases and regenerate the sieves.

The only other manufacturer of controlled-atmosphere systems uses liquid nitrogen (at -320° F.) to keep storage temperatures down and to control oxygen content.

(over)
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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: L. Baldwin

TRIPLET-SINGLET ENERGY TRANSFER IN PROTEINS

0.321

Galley, William C. (Department of Chemistry, McGill University, Montreal, Quebec, Canada), and Lubert Stryer (Department of Molecular Biophysics and Biochemistry, Yale University, New Haven, Connecticut 06520)
Biochemistry 8, No. 5, 1831-1838 (May 1969)

The transfer of electronic excitation energy between chromophores is of three known types: singlet-singlet, triplet-singlet, and triplet-triplet. Many examples have been given of singlet-singlet transfer in proteins, and recently (1968) the present authors demonstrated triplet-triplet transfer in an enzyme-inhibitor complex, thereby providing evidence for the presence of a tryptophan residue near the active site. In the present article, they show that triplet-singlet transfer can occur in proteins.

The system studied was a complex of proflavin and α -chymotrypsin in which the tryptophan residues of chymotrypsin were the triplet energy donor and the proflavin bound at the active site served as the singlet acceptor. The triplet-singlet transfer was revealed by a delayed fluorescence from the proflavin and a selective quenching of the tryptophan phosphorescence. The transfer efficiency in the proflavin-chymotrypsin complex was greater than 80 percent. This efficiency and the kinetics of the delayed proflavin fluorescence and of the residual tryptophan phosphorescence revealed at least two classes of tryptophan residues; their rate constants for triplet-singlet transfer were 20 and 2.2 sec. (over)

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ABSTRACTER: L. Baldwin

MICROSOMAL EPOXIDATION: EFFECT OF AGE AND DURATION
OF EXPOSURE TO DIETARY DDT ON INDUCTION

Gillet, James W. (Department of Agricultural Chemistry, Oregon State University, Corvallis)
Bulletin of Environmental Contamination and Toxicology 4, No. 3, 159-168 (May-June 1969)

0.35
(9.19)

Because of the existence of poisonous pesticide residues in our environment, studies have been made on the possible interaction of these compounds with microsomal metabolism. Certain compounds, such as DDT, show inductive effects on the microsomal mixed function oxidases of drugs and pesticides. The extent of induction of microsomal epoxidation is dependent on the concentration of DDT in the diet and has a "no effect" dietary dosage level of between 1.0 and 5.0 p.p.m.--in the same range as for certain drug (for example, toxaphene) metabolizing activities (Gillet, Chan, and Terriere 1966; Gillett, 1968; Kinoshita, Frowley, and Dubois, 1966). A single large dose of DDT is capable of maintaining elevated microsomal drug metabolism for several weeks. Little is known about the persistence of the effects of low dietary dosages of chlorinated hydrocarbon insecticides. Therefore, the present study was carried out to provide further information to aid in the evaluation of dietary chlorinated hydrocarbon insecticides as possible public health hazards. (over)

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ABSTRACTER: F. T. Piskur

Evaluation.--The manufacturer of the converter-scrubber unit claims several advantages for his system: it can maintain the optimum oxygen content required to prevent decomposition of many different types of product; operating costs are low enough to offset equipment costs in from 3 to 5 years. The manufacturer of the nitrogen-controlled system points out that his system requires no additional refrigeration, as the other system does. But, the response is that the converter-scrubber system requires only 0.5 ton of refrigeration to chill the processed air that returns to the cold room at 75° F.--and in comparison with the 10- or 15-ton capacity of a typical storage area, 0.5 ton is negligible. Moreover, its operating cost of 0.7¢ per bushel for apples, say, gives it a decided advantage over nitrogen-using systems, which operate at a cost of almost 4.0¢ per bushel.

Suppliers say that if any type of controlled-atmosphere system is workable and the equipment is reasonable, shippers will react favorably, for it can extend the preservation time of produce to as long as 9 months (with refrigeration only, the time is only 3 or 4 months).

Chemical Abstracts 70, No. 9, 3465 (March 3, 1969)

Hochachka, Peter W., and G. N. Somero (Univ. British Columbia, Vancouver, British Columbia)

ADAPTATION OF ENZYMES TO TEMPERATURE

0.35

The author studied the effects of three parameters of dosage other than dietary concentration on the induction of microsomal epoxidase in a series of litter-mate (rats) comparisons. These parameters were age of rats at exposure to dietary DDT, duration of the exposure to a given dosage of DDT, and the persistence of the effect of a given exposure in the absence of dietary DDT.

He found that the basic level of microsomal epoxidase increases with the age of the rats; however, the amount of DDT-induced increase per gram of liver or per milligram of microsomal protein remains the same. A comparison of the effects of dietary DDT on the increase or decrease in the activity of microsomal epoxidase in the livers of litter mates (disregarding the various ages of the animals) showed that (1) the effectiveness of a 25 p.p.m. diet of DDT reaches a plateau after a 1-week exposure and epoxidase continues to be significantly elevated as long as the rat remains exposed; and (2) when DDT is withdrawn from the diet, the level of microsomal epoxidase activity returns relatively promptly to the level of unexposed animals, regardless of the length of exposure. The author notes that if cyclodiene epoxidation is considered a typical activity of the microsomal mixed function complex, transient exposure to dietary DDT concentrations even 100 times those found in normal human diets would not be detectable in regard to effects on rat microsomal activities a short time after exposure.

[2 figures, 1 table, 16 references]

0.112

through the cine attachment of the microscope. Because the camera is sensitive to a broad band of wavelengths, the investigator can select, merely by placing a narrow-band filter in the microscope illuminator, any wavelength that will not affect the subjects. The effect of directional light on the subjects can be investigated by introducing one or more beams parallel to the microscope stage and at right angles to the field illuminator beam; these beams in no way affect the TV image. The brilliance and contrast of images on the viewing screen--and on the tape--can be modified according to the needs of the investigator.

With the tape recorder, the investigator can record responses and replay them at his convenience. He can select any part of the record for analysis, and he can slow down the tape speed to show more clearly particular segments of a behavioral act. To reduce the inflow of data presented to the computer from the mass of information viewed by the TV camera, a video preprocessor has been designed. This "bugwatcher," which is a preprocessing interface between the video source and a digital computer, selectively strips off that part of the picture that is of interest to the investigator. It can blank out intervallic frames (for example, when the behavior of a slow-moving organism is being analyzed), preventing redundant information from glutting the computer. Other advantageous characteristics of the bugwatcher are also described.

The apparatus allows the investigator to store in the memory of the computer a record of changes in the position of an organism or its parts. Presently the authors are investigating the behavior of certain motile phytoplankters, some no larger than 3-5 microns, that constitute a large part of the biomass in the sea. They have observed the effects of changes in temperature, salinity, light intensity, and wave length on the activity of dinoflagellates and have demonstrated how the behavior of the individual cell influences such characteristics as vertical migration and distribution. [2 photographs]

0.12

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[2 figures, 1 table, 16 references]

0.321

The eightfold difference between the efficiency of internal conversion and of intersystem crossing led the authors to conclude that the major pathway from the excited singlet level of tryptophan residues in chymotrypsin is internal conversion. They suggest that triplet-singlet transfer can serve as a useful adjunct to singlet-singlet and triplet-triplet transfer during deduction of proximity relations in biological macromolecules and as a source of fundamental information about processes involving both the singlet and the triplet excited states of proteins.

[8 figures, 1 table, 32 references]

The scientific and technical research that has been done on the production and the nutritional value of special proteins--for example, leaf protein concentrates prepared by spray-drying and algal proteins recovered from chlorella--is reviewed. Yeast and bacterial proteins are discussed, including the culture of *Torulopsis utilis* and the various processes for manufacturing proteins from hydrocarbon feed stocks and gaseous methane are outlined, and the efficiency of mixed function complex, transient exposure to dietary DDT concentrations even 100 times those found in normal human diets would not be detectable in regard to effects on rat microsomal activities a short time after exposure.

[Abstracter: L. Baldwin]
Food Manufacture 44, No. 4, 51 (April 1969)

Strahmann, R.
Alimenta 68, 102 (1968)

UNCONVENTIONAL SOURCES OF PROTEIN
0.321

EFFECTS OF SELENOCYSTINE AND SELENOMETHIONINE
ON ACTIVATION OF SULPHYDRYL ENZYMES

Dickson, R. C., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis 95616) Archives of Biochemistry and Biophysics 131, No. 1, 100-110 (April 1969)

Information is needed on the biochemical functions of selenium compounds because (1) the trace element selenium apparently is an essential nutrient in plants, microorganisms, and animals and (2) recent studies indicate that pathological conditions arise from selenium-deficient states. A major difficulty in relating nutritional evidence to biochemical studies is that the level of selenium in normal tissues occurs in parts per million. Recent research studies have dealt with the antioxidant properties of selenium and the protection afforded by various selenium compounds to amino acids and proteins against free radical damage resulting from peroxidative conditions or ionizing radiation. In the present study, the authors explore the effect of the selenoamino acids, as compared with that of analogous sulfur amino acids, on the activity of sulphydryl enzymes.

The authors found from these studies that selenocystine catalyzes the activation of papain and glyceraldehyde-3-phosphate dehydrogenase and the inactivation of ribonuclease, which takes place through sulphydryl-disulfide exchange reactions with sulphydryl compounds. Because the catalytic effect occurs at pH 7 (over)

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: F. T. Piskur

0.5 VIRAL DEPURATION BY ASSAYING INDIVIDUAL SHELLFISH

(9.19, 2.3)

Seraichekas, H. R., D. A. Brashear, J. A. Barnick, P. F. Carey, and O. C. Liu (Northeast Marine Health Sciences Laboratory, Environmental Control Administration, Public Health Service, Narragansett, Rhode Island 02882) Applied Microbiology 16, No. 12, 1865-1871 (December 1968)

Previous studies have shown that shellfish artificially contaminated with poliovirus and coxsackievirus were cleansed by depuration treatment under controlled conditions. In these studies, each of the samples consisted of a pool of from 5 to 20 shellfish. The problem arising in the use of such sampling is that the presence of virus in undepurated animals may be obscured by the predominating number of cleansed animals, which serve as a diluent of the sample. The uncleaned shellfish that might be present would still serve as carriers of viruses. The purpose of the present study was to make a more critical evaluation of the process of depuration of shellfish, taking into consideration various aspects relevant to the future practice of commercial depuration. The authors considered the following aspects: variability of the volumes of individual shellfish samples; variability of viral accumulation in the shellfish under controlled environmental conditions; variability of viral contents in shellfish and the percentage of animals being cleansed after various intervals of depuration; and the depurability of shellfish polluted with low levels of virus. (over)

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Abstracter: F. T. Piskur

0.5 SURFACE OF FRESHWATER FISH

(2.05)

Pacha, R. E., and Sook Porter (Department of Microbiology, Oregon State University, Corvallis 97331) Applied Microbiology 16, No. 12, 1901-1906 (December 1968)

Certain myxobacteria are pathogenic to both fresh water and anadromous fish; both natural and hatchery populations of fish are susceptible. Serious economic losses have occurred in populations of fish as a result of the diseases the organisms cause. Nonpathogenic myxobacteria have been found on the skin and gills of fresh-water fish. On the basis of the morphology of the colonies, some of the nonpathogenic myxobacteria could be easily confused with the pathogenic species. The purpose of the present study was to characterize the saprophytic myxobacteria that occur on the surface of fish and to determine the degree of similarity between those organisms and known pathogenic species. (over)

Thirty-two strains of nonpathogenic myxobacteria were studied. The organisms were isolated from fish taken at various locations in the Pacific Northwest. Both fresh-water and anadromous fish were used as the host source of bacteria. One culture of Chondromyces columnaris and one of C. psychrophila (both pathogenic) were used for comparative purposes. Morphological, cultural, biochemical, and serological studies were carried out on all strains. (over)

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Abstracter: F. T. Piskur

0.5 HYDRAULIC POWER ON THE SEALED

(2.149, 2.12)

Morgan, Robert (Marine Resources Unit, Portsmouth College of Technology, Portsmouth, England) World Fishing 18, No. 6, 68 (June 1969)

Probably the best way of delivering power to an underwater vehicle is by hydraulic rather than electrical means. Flexible tubes appropriately weighted and buoyed could be the means whereby a surface vessel could control and furnish power to a vehicle on the seabed. If the static pressure within the tubes were adjusted to balance the outside pressure, the tubes would have to withstand a differential pressure of only between 15 and 50 p.s.i. Moreover, by using a wind propeller, the surface vessel would have a source of free power for operating its pumps. In the Southern Ocean, where normal wind speed rarely falls below 40 knots, this method of operating would be particularly adaptable. (over)

Seabed tractors designed to operate hydraulically could be used for mining, fishing, and harvesting seaweed. For instance, two widely spaced unmanned tractors towing a large net could be used to catch flatfish and other types of fish that stay close to the bottom during certain seasons or times of the day. The vehicles could be so designed that the hydraulic exhaust would blow water forward onto the surface of the seabed, forcing oysters, scallops, and other bottom dwellers into catching receptacles. Or they could be equipped with cutting devices (over)

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Abstracter: L. Baldwin

2.00 THE CONNECTIVE TISSUES OF FISH.
(2.02) II. GAPPING IN COMMERCIAL SPECIES OF FROZEN FISH
IN RELATION TO RIGOR MORTIS

Love, R. M., J. Laverty, and P. J. Steel (Ministry of Technology, Torry Research Station, Aberdeen, Scotland) Journal of Food Technology 4, No. 1, 39-44 (March 1969)

Gaping is a phenomenon in which the sheets of connective tissue (myocommata) in fillets of fish fail to hold the blocks of muscle (myotomes) together. Love and Robertson (1968) showed that if the fish were frozen in the round before rigor mortis, thawed, and filleted, there was little or no gaping. But, if the fish were frozen in rigor mortis 1 day after being caught, the amount of gaping depended upon the biological condition of the fish--a healthy fish showed much gaping and a starved or spent fish showed little or no gaping. The purpose of the present study was to determine whether the phenomenon was general with respect to fish frozen before or after rigor mortis.

Nine species of fish were used in the tests: catfish, haddock, cod, saithe, halibut, lemon sole, plaice, skate, and redfish. The whole fish were frozen and stored at -30° C.

(over)

2.1121 THE COLLECTION AND APPLICATION OF TRAWL PERFORMANCE DATA
(2.116)

Chaplin, P. D. (White Fish Authority, [England]) World Fishing 18, No. 6, 58-59 (June 1969)

Early instruments used to measure the operating characteristics of trawling gear recorded their data internally. Thus the data could not be assessed until the gear to which the instruments were attached had been hauled aboard after each trial, and the instruments were of no practical use to the fisherman for monitoring the state of his gear. To solve these problems, data-taking systems were designed that would transmit data from the gear to the ship. As a rule, the systems measured some or all of the following positions and orientations: headline downward, headline upward, headline forward and horizontal, headline forward and 15 degrees downward, net square downward, horizontality of the wing ends to each other, and horizontality of one side bosom to the other. In addition, the speed of the net through the water was logged. Although these systems were very valuable for providing immediate design data and for assisting a skipper in planning fish-hunting tactics, the cable used to transmit the data to the ship was expensive, easily damaged, and of limited maneuverability. The need, then, was for a cheap, reliable system of obtaining information about the geometry of the gear and the conditions of the water.

(over)

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Abstracter: F. T. Piskur

NOTAS SOBRE ORGANISMOS MARINHOS INCRUSTANTES
E PERFURANTES DAS EMBARCAÇOES
[NOTES ON MARINE ORGANISMS INCrusting AND PERFORATING SHIPS]
Barroso Fernandes, Liana Marília, and Ayrton Fernandes da Costa (SUDENE)
Boletim de Estudos de Pesca 7, No. 3, 7-26 (September-December 1967) (In Portuguese; English summary)

Purpose.--The waters of the Port of Recife are infested with barnacles (Balanus sp.), marine borers (Sphaeroma sp.), and shipworms (Teredinidae). The authors decided to test the efficiency of coating products generally used to inhibit the fixation of the barnacles and the penetration of the wood-eating animals.

Action.--Planks made of the various kinds of wood commonly used in local boat construction were coated with pitch, with a paint having a synthetic-resin base, and with a paint having a phenolic-resin-and-epoxy base. The planks were submerged in the waters of the harbor to depths ranging from 0.5 to 1.0 m. and examined, a lot at a time, at 2-month intervals.

Findings.--Pitch reduced the penetration of teredos by 65 percent during the first 6 months; it had no effect on barnacles or marine borers. The synthetic-resin paint completely protected the wood against teredos and Sphaeroma for the (over)

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Abstracter: L. Baldwin

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Abstracter: L. Baldwin

2.115 ONE HULL OR TWO?

2.116 (2.1471)

Leakey, R. D., et al.
World Fishing 18, No. 6, 52-55 (June 1969)

This block of articles gives the views of proponents and skeptics on the sea-keeping characteristics of catamarans.

The lead article explains why its author believes that of the three main hull configurations--single hull, trimaran, and catamaran--only the well-designed, power-driven catamaran cannot be rolled over by wave action. In high seas, wave action is in a circular motion on the vertical plane, the water at the foot of the wave pushing upward and that at the top breaking downward. Thus once a trimaran or a boat with a keel tilts over, the lower float and the keel act as levers to add to the rolling action. The lower hull of a catamaran, on the other hand, tends to act much as a surf board does--that is, it surfs away from the foot of the wave and pushes the upper hull back toward the horizontal. The author of this theory adds that catamarans have additional features that make them preferable as fishing vessels: they have decks like factory floors; big loads above the center of gravity are no cause for worry; icing doesn't cause them to heel; they have a large number of watertight compartments that make for safety; pitching is no worse than on a single-hull vessel, and roll, no matter at what angle the wind comes, is significantly less. (over)

AUTO-TOWING ON DECCA LANES

2.116 (2.1471)

Anonymous
World Fishing 18, No. 6, 46-47 (June 1969)

The conventional automatic pilot takes its heading reference either from a north-seeking gyro compass or a transmitting magnetic compass. The new autopilot described here takes its heading reference from the navigator system; thus the ship can be automatically steered along a Decca lane. High-speed survey vessels have used the system successfully at speeds of up to 36 knots. By adding a Decca "Seatrack" unit to the autopilot, vessels can steer precise tracks over the ground by holding any one-hundredth of a selected Decca lane. Tracking accuracies have proved to be of the order of 1 or 2 meters.

The new navigational system consists of the Seatrack unit, which is quite small, weighing about 15 lb.; the autopilot control unit; a steering gear actuating system; a rudder translator; and two power packs. The Seatrack unit contains a high precision rate gyro compass, an essential to the system, since navigator lanes, being hyperbolic rather than straight, have a constant rate of change, which the rate gyro senses. In operation, any deviation of the ship from a preset navigator track results in an error voltage, which is converted through the autopilot amplifier into rudder commands that keep the ship on the required one-hundredth of a lane. The Seatrack costs £850. [3 figures]

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AUTO-TOWING ON DECCA LANES

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Abstracter: L. Baldwin

SEARCHING FOR TUNA

(1.120)

Potthoff, Thomas (Tropical Atlantic Biological Laboratory, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Miami, Florida 33149)
Commercial Fisheries Review 31, No. 7, 35-37 (July 1969) (Separate No. 844)

Purpose.--Research cruises over the past several years have produced large volumes of data from various sections of the tropical Atlantic, but biological investigations in the central tropical Atlantic--the area covered by ATEX [Atlantic Tradewind Expedition]--have been virtually nonexistent. TABL [Tropical Atlantic Biological Laboratory] therefore welcomed the opportunity for one of its biologists to be present aboard the Discoverer during the expedition. Knowledge of the presence or absence of larval, juvenile, and adult tunas in the region could be important to an understanding of the life cycle of tunas, and, conceivably, might help commercial fishermen in their quest for new fishing grounds. Collections made on ATEX of marine life other than tunas might also be valuable as indicators of the kinds of prey organisms that are available in the central Atlantic to large pelagic fishes, particularly the tunas. My objectives as an observer on the Discoverer were to collect small tunas and other organisms by dipnet under a night light, to collect larval tunas and other zooplankton by 1-meter net tows, and to observe and make records of schools of tuna and other large fishes.

Findings.--The biological observations made during the cruise in this poorly known mid-Atlantic area may be summed up as follows:

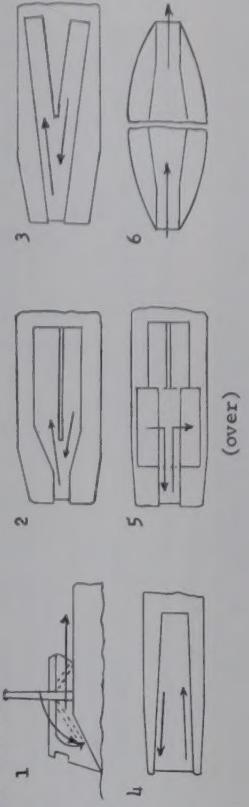
(over)

GDR [GERMAN DEMOCRATIC REPUBLIC] INSTITUTE EVALUATES

SIX TWIN-TRAWL SYSTEMS

Anonymous
World Fishing 18, No. 6, 56-57 (June 1969)

The efficiency of a trawling operation depends to a great extent on the relative proportion of fishing and nonfishing time. One way to reduce the proportion of nonfishing time is to use two trawls alternately--shooting one as soon as the other is hauled. East German engineers at the Wolgast Institute for Shipbuilding Technology have compared six variations of the two-trawl system and evaluated them in terms of their practicality. The six methods of hauling and shooting are illustrated below.



(over)

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2.112

1. Not a single school of tuna was sighted and no juvenile tuna were collected, although the chances of finding tuna appeared favorable on the basis of the temperature (25°-27° C.) and the presence of organisms suitable for tuna food.

2. Dolphin, the only large pelagic fish present in large concentrations, fed heavily on flyingfish. To my knowledge, this is the first report of concentrations of dolphin in the mid-Atlantic.

3. Study of the plankton tows made during this voyage (now in progress at TABL) has so far revealed the presence of a few skipjack tuna larvae. When all samples have finally been studied, better conclusions may be drawn as to the presence or absence of tunas in the tropical mid-Atlantic.

4. The many large concentrations of flyingfish, lanternfish, octopi, and salps observed, and the other organisms seen or collected, suggest an abundance of forage organisms suitable for tuna, marlin, and other large pelagic fishes.

[4 figures]

Guide belts complete the apparatus. [Abstractor: F. T. Piskur] conveyor in the vertical plane to form a clamp-conveyor. A scissor linkage and apparatus is used for both hoisting and lifting fish. Two descending belts

Food Technology 23, No. 8, 38 (August 1969)

Document A, and E, Jahn (pat.), German Patent Publ. Appl. 1,429,828

PTSH PROCESSING

[2.3]

The seaworthiness of catamarans is not questioned by the critics. But they do point out some disadvantages that they believe are serious. Such factors as berthing space; the availability of hold space; the effect of hull loads on draft, reserve buoyance, and height of center section above the top of the waves; the size and type of engine that can be accommodated and serviced in the smaller catamarans; and the violent up and down motion in larger catamarans are cited. One owner found that the cost of the vessel was not substantially higher than the cost of a conventional single-hull vessel of equivalent size, since smaller propulsion machinery provides the required speed. He also found that the bows of the twin hulls did not plow into the sea, as expected. But he did find that the ship's movements in a following sea sometimes frightened the crew and that vibration was a problem at low speeds (putting the engines out of sync damped the vibration). His experience in floating ice was that ice built up between the hulls and brought the ship to a standstill.

Catamarans are economical, and therefore justified, under conditions when high speed, a large deck area, and light displacement are requisites.

[2 figures, 8 photographs]

A clamp beneath the fish on a conveyer track pulls the hanging gut taut so a clamp can be cut off the fish's throat. [Abstractor: F. T. Piskur] Food Technology 23, No. 8, 38 (August 1969)

Document A, and E, Jahn (pat.), German Patent Publ. Appl. 1,429,828

FISH DECUTTING

[2.3]

2.1471

Practicality was judged on the basis of seven characteristics. Each characteristic was allotted an "importance factor," the ideal score being 4 times the importance factor. Thus, if the importance of a characteristic were 8 and a method scored 2, its score for this characteristic would be 16. The ratings of the six methods are tabulated below.

Characteristic	Importance factor	Ideal score	Score of method
Operational reliability (trouble-free operation; workability in bad weather and with net sounder)	8	32	16
Time saving (increased fishing time and time saved in preparing gear)	8	32	32
Crew safety (as compared with safety of using conventional gear)	10	40	20
Change-over time (availability of a second net during normal fishing or when one net is damaged)	6	24	12
Work load (physical effort required of crew during towing and hauling)	5	20	5
Capital cost (in terms of extra winches and other gear)	5	20	10
Reserve capacity (provided by additional winches, etc., and for dealing with extra heavy cod ends)	5	20	5
Value rating (in percent)	-	100	49

[4 figures, 1 table, 6 references]

2.115

2.112 A STUDY TO DETERMINE THE ECONOMIC FEASIBILITY (1.53, 9.3) OF ESTABLISHING A COMMERCIAL HAKE FISHERY

Anonymous

Prepared by Staff, Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Seattle, Washington
A Study to Determine the Economic Feasibility of Establishing a Commercial Hake Fishery, 54 pp., Appendix (March 1969) (Sponsored by the Economic Development Administration, U.S. Department of Commerce, Washington, D.C.). Copies available from the Clearinghouse for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Virginia 22151. Price \$3.00 hard copy, \$0.65 microfiche.

Purpose.--As part of a continuing program by the Bureau of Commercial Fisheries (BCF) to assist in the development of a viable fishery on the offshore hake stocks along the Pacific Coast, a study was continued in 1967 in cooperation with the Economic Development Administration (EDA) to investigate the economic feasibility of developing a fishery on this resource. This study was carried out to provide vessel owners, fishermen, and plant operators with the information needed to determine the performance of existing trawl vessels when fishing for hake with modern midwater trawl gear. The performance of these vessels with regard to that which the processors can pay for fish will ultimately determine the success of a reduction fishery for Pacific hake.

Presentation.--This paper represents the final report of the EDA-financed study. The distribution of catch and effort and the gear used in the 1967 fishery are presented first. The economics of the fishery are then discussed as they pertain to the establishment of a viable fishery on Pacific hake.
[26 figures, 11 tables, 3 exhibits, 10 references]

[Reprinted in part]

2.9 SYMPOSIUM ON NATURAL FOOD TOXICANTS

Crosby, Donald G., et al. Papers presented at 156th Meeting, ACS, Atlantic City, New Jersey, September 8-13, 1968, Division of Agricultural and Food Chemistry 17, No. 3, 413-538 (May-June 1969)

Of the 20 papers constituting this symposium, the following are of interest to people in fisheries:

Introduction, Donald G. Crosby (Department of Environmental Toxicology, University of California, Davis 95616), p. 413

Studies of Shellfish Poisons, Edward J. Schantz (Physical Science Division, Department of the Army, Fort Detrick, Frederick, Maryland 21701), pp. 413-416. [1 table, 31 references]

Toxins From Eggs of Fishes and Amphibia, Frederick A. Fuhrman, Geraldine J. Fuhrman, David L. Dull, and Harry S. Mosher (Max C. Fleischmann Laboratories of the Medical Sciences and Department of Chemistry, Stanford University, Stanford, California 94305), pp. 417-424. [6 figures, 4 tables, 50 references]

Use of Chlorella in Mycotoxin and Phycotoxin Research, Miyoshi Ikawa, Daniel S. Ma, Gabrielle B. Meeker, and Robert P. Davis (Department of Biochemistry, University of New Hampshire, Durham, New Hampshire 03824), pp. 425-429. [6 figures, 6 tables, 7 references]

(over)

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UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

Abstracter: F. T. Piskur

3.15 EFFECTS OF HIGH-ENERGY RADIATION ON THE LIPIDS OF FISH

(4.4)

Dubravcic, M. F., and W. W. Nawar (Department of Food Science and Technology, University of Massachusetts, Amherst 01002) Journal of Agricultural and Food Chemistry 17, No. 3, 639-644 (May-June 1969)

No detailed information is available on the chemical compounds formed by irradiating fish or fish oil. The purpose of the present research was to obtain fundamental information on the primary effects of ionizing radiation under non-oxidative conditions on the lipid fraction of fish.

Mackerel was selected for the study because it has a high fat content, it lends itself to mild methods for extraction of the lipids, and it is readily available in a fresh condition. The lipids were extracted from the fish by pressing fillets at room temperature. The samples were irradiated with gamma rays from a Co60 source. The lipids were irradiated under vacuum at 0° C. and at 25° C., and at three irradiation doses—0.3, 2.0, and 6.0 Mrads. The volatile components formed by irradiation were studied using gas chromatography and mass spectrometry.

Fifty-six compounds were identified. These compounds included the normal alkanes C₁ to C₁₇; the 1-alkenes C₂ to C₁₇; the alkadienes C₁₂ to C₂₂; the internally saturated alkenes C₁₄ to C₂₁; the C₁₇ triene; the C₁₁ alkyne; and the C₁₁ alkene.

(over)

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UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

Abstracter: F. T. Piskur

3.15 MAGNESIUM AND CALCIUM CONTENTS OF FISH AND SQUID TISSUES

(8.8, 8.42, 7.593)
Taguchi, Takeshi, Kosaku Suzuki, and Isami Osakabe (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 35, No. 4, 405-409 (April 1969)

The occurrence of struvite in canned seafoods is common but undesirable. As noted by Osakabe and Suzuki (1966), the major component of struvite in these foods is magnesium phosphate, though a very small amount of calcium is also present. To clarify the mechanism of struvite formation, the authors measured the magnesium and calcium content of fish and squid tissues, determined the amount of both metals that was liberated from the muscle proteins during storage, and ascertained the intracellular distribution of magnesium in the muscle. The muscle (dorsal, abdominal, and dark), heart, liver, and kidney of mackerel (*Pneumatophorus japonicus japonicus* Houttuyn), jack mackerel (*Trachurus japonicus* Temminck and Schlegel), barracuda (*Sphyraena japonica* Cuvier), flatfish (*Limanda herzensteini* Jordan and Snyder), skipjack (*Katsuwonus pelamis* Linnaeus), and carp (*Cyprinus carpio* Linnaeus) and the muscle (hood, mantle, and arm) and liver of squid (*Todarodes pacificus* Steenstrup) were used.

Atomic absorption spectrophotometry revealed that the calcium content ranged from 4 to 36 mg. percent in the fish tissues and from 17 to 28 mg. percent in

(over)

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Abstracter: L. Baldwin

3.15 PROCESS CRITERIA FOR PRODUCING RADIATION STERILIZED FISH PRODUCTS

(4.4)

Learson, R. J., L. J. Ronisvalli, and B. W. Spracklin (Bureau of Commercial Fisheries, Technological Laboratory, Gloucester, Massachusetts); F. Heilzman (U.S. Army Natick Laboratory, Natick, Mass.)

Food Technology 23, No. 8, 85-91 (August 1969)

(over)

So far attempts to prepare radiosterilized fish fillets that are stable at ambient temperatures have not been successful. The combined effect of processing to inactivate enzymes and the high irradiation required for sterilization resulted in fish fillet products with undesirable flavor and texture. The purpose of the present study was to develop a suitable technique for producing radio-sterilized products from fish fillets.

The experimental processes involved: (1) the addition of preservatives and coating materials, (2) inactivation of the enzymes, (3) packaging of the fish product, (4) cooling the packaged product to -78° C. or 0.6° C., (5) packing the packaged fish in insulated containers, and (6) radiosterilizing the packaged products. Cod, haddock, flounder, and ocean perch were tested.

The authors found that holding the products at low temperature during irradiation and using various additives (such as sodium bisulfite and butyl hydroxy anisole) reduced the adverse changes in flavor and odor induced by the irradiation

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Abstracter: F. T. Piskur

3.12

PRESERVATION PROCESS

British Patent 1,142,015
Unilever Ltd. (pat.)

Food Technology 23, No. 7, 69 (July 1969)

Meat and fish products are preserved for 30 days or longer at 20° C. by treatment with solutions of sodium chloride, lactic acid, and acetic acid.

[Abstracter: F. T. Piskur]

3.12 FISH TREATMENT

Japanese Patent 6225/69

Shirashi Calcium K.K. (pat.)
Food Technology 23, No. 8, 38 (August 1969)

The fish are coated with material containing colloidal calcium carbonate and egg albumin or glycerol fatty acid esters.

[Abstracter: F. T. Piskur]

3.336 ASEPTIC CANNING

U.S. Patent 3,437,495
Jeppson, M. R. (pat.)
Crydry Corp.
Food Technology 23, No. 8, 48 (August 1969)

Aseptic canning is accomplished using microwave energy.

[Abstracter: F. T. Piskur]

3.12 MANUFACTURE OF LOW SODIUM FOODS
(0.4)
Viguerie, J.
Revue de la Conserve 24, No. 10, 169 (1968)
Food Manufacture 44, No. 4, 47 (April 1969)

The two main problems in the production of sodium-restricted foodstuffs involve the replacement of salt by other adjuncts to maintain a good organoleptic quality and the chemical removal of sodium to satisfy medical demands. These difficulties make the accurate analysis of raw materials and additives by flame photometry doubly important. A number of food specialties (including canned ham, meat conserves, liver pastes, sausage, and fish products), along with the low-sodium concentration attainable for each, are given.

[Abstracter: L. Baldwin]

2.3

FISH STEAK CUTTING

U.S. Patent 3,433,647
Johnston, D. S. (pat.)

Food Technology 23, No. 7, 49 (July 1969)

Large pieces of fish are held in a cavity in the face of a mold. The steaks are cut by a flat-surfaced, sharp-edged, shear plate that is moved across the mouth of the cavity.

3.12

3.12 **FISH STEAK CUTTING**
(0.4)
Bucktrout in the Food of Man and His Allies, Donald G. Crosby,
National Toxins Backround in the Food of Man and His Allies, H. W. Head, G. Crosby,
Agricultural Biochemistry, University of Hawaii, Honolulu, Hawaii 96822, pp. 49-52.

3.12 **METHOD OF PREPARING POLYACRYLIC ACIDS IN FOODS**
Thomas Pezzlo (Division of Food Chemistry, Food and Drug Administration, U.S. Public Health Service, Washington, D.C., 20204), pp. 457-460. [6 figures, 5 tables, 38 references]
of Food Chemistry and Technology, Bureau of Science, Food and Drug Administration, Washington, D.C., 20204, pp. 527-531. [5 tables, 58 references]
Chemical Additives in Foods, John M. Head and Drug Administrators, [Abstracter: F. T. Piskur]

3.12 **METHOBOLITES WHICH CONTAIN SUBSTITUTED 7,8-DIHYDROFURYL-3-ULTRAFURANS**
DHP) and 2,3,7,8-tetrahydrofuran [2,3-b]furan (THFF), J. V. Rodriks Division
of Food Chemistry and Technology, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204, pp. 49-52. [6 figures, 5 tables, 38 references]
Chemical Additives in Foods and Feeds, J. M. Head (Department of
Toxic Peptides and Amine Acids in Foods and Feeds, J. M. Head) (Department of
Food Chemistry and Technology, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204), pp. 49-52. [6 figures, 5 tables, 38 references]
Food and Drug Administration, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204, pp. 49-52. [6 figures, 5 tables, 38 references]

9.2

3.12 **METHOBOLITES WHICH CONTAIN SUBSTITUTED 7,8-DIHYDROFURYL-3-ULTRAFURANS**
DHP) and 2,3,7,8-tetrahydrofuran [2,3-b]furan (THFF), J. V. Rodriks Division
of Food Chemistry and Technology, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204, pp. 49-52. [6 figures, 5 tables, 38 references]
Chemical Additives in Foods and Feeds, J. M. Head (Department of
Food Chemistry and Technology, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204), pp. 49-52. [6 figures, 5 tables, 38 references]
Food and Drug Administration, Bureau of Science, Food and Drug Administration,
Washington, D.C., 20204, pp. 49-52. [6 figures, 5 tables, 38 references]

3.30

3.15

4.4 THE RATE OF PHOSPHOLIPID HYDROLYSIS IN FROZEN FISH
(8.8)

Olley, June, Jane Farmer, and Eva Stephen (Ministry of Technology, Torry Research Station, Aberdeen, Scotland) Journal of Food Technology 4, No. 1, 27-37 (March 1969)

Love (1962) observed that insolubilization of actomyosin in salt solution, the measurement of toughness of fish as measured by the cell fragility method, and the production of free fatty acids (FFA) from phospholipids in cold stored cod all had similar activation energies. Olley and Lovern in 1960 and 1962 noted that the first two reactions appeared to go to completion at all temperatures, but the phospholipid hydrolysis did not appear to approach the same asymptote at all temperatures. The reaction seemed to go almost to completion at temperatures just below the freezing point, but at lower temperatures the asymptote became less. The purpose of the present study was to confirm previous work showing the more rapid rate of FFA production in Gadoid species and to check the limited amount of data on change in the asymptote with temperature for the phospholipid hydrolysis.

The phospholipid hydrolysis was studied in lemon sole (Microstomus kitt) and haddock (Gadus aeglefinus) between -7° and -29° C.
(over)

6.190

NUTRITIVE CONTENT OF CHILEAN ANCHOVETTA FISH MEAL EVALUATED BY CHEMICAL METHODS

Kifer, R. R., W. L. Payne, David Miller, and M. E. Ambrose (Technological Laboratory, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, College Park, Maryland) Feedstuffs 41, No. 31, 24-25 (August 2, 1969)

Background.--Chilean anchovetta (Engraulis ringens) are small fish, attaining a maximum length of about 15 cm. and a maximum weight of about 30 g. They are caught from the Humboldt Current off the coast of Peru and Chile and used by processors in both countries for making fish meal. In 1967, Chilean manufacturers produced 143,953 tons of fish meal, 40,937 tons of which was exported to the United States; in 1966, they produced 214,013 tons, exporting 89,381 tons to the United States.

Despite the fact that the meals from the two countries are manufactured from the same resource, they differ in composition. In the first place, the Peruvians lose a considerable amount of raw material because the shallowness of their harbors forces them to pump the fish an appreciable distance from the vessel to the dock. In addition, the Chilean meal contains solubles, whereas the Peruvian meal does not. Moreover, the concentration of oil in the fish cycles with the season--in December or January, it reaches a low of from 5 to 7 percent; then rises to 12 or 13 percent in May or June; it falls rapidly to about 4 percent in August or September, and attains a second peak of 9 percent in November. Then the cycle starts again.
(over)

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

6.192

UREA COMPARISON

Anonymous Feedstuffs 41, No. 32, 28-29 (August 9, 1969)
Problem.--Researchers at the University of Puerto Rico, Lajas, were interested in the effect on the feed consumed and the milk produced by cows whose bagasse rations had been supplemented with urea plus fish meal.

Solution.--Nine Holstein and nine Brown Swiss cows were grouped 6 days post partum, fed adjustment diets for 6 weeks, and then fed one of three complete rations for 105 days. The rations consisted basically of ground shelled corn (37.45 to 44.95 percent), ground bagasse (25 percent), and cane molasses (25 percent), with salt, bone meal, and vitamin supplements added. In addition to these ingredients, diet U2 contained 9 percent tunafish meal and 1.5 percent urea (45 percent nitrogen); diet U3, 4.75 percent tunafish meal and 2.25 urea; and U4, no fish meal and 3 percent urea. Feed was adjusted daily to permit maximum voluntary consumption. Using the corresponding data obtained during the preliminary adjustment period as independent variables, the researchers performed covariance analysis on the data obtained during the 105-day test period.

Results.--The results, as reported at the annual meeting of the American Dairy Science Association in Minneapolis, showed that the mean feed consumption and the mean productive responses declined progressively as the proportion of urea (over)

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Abstracter: L. Baldwin

6.190 THE RATE OF PHOSPHOLIPID HYDROLYSIS IN FROZEN FISH

(8.8)

Rao, D. Ramananda, and P. V. Kamasastry (Central Institute of Fisheries Technology (Unit), Bombay-5, India) Indian Journal of Fisheries 10, No. 1, Section B, 4-7 (April 1963)

The export of frozen frog legs from Kerala and Maharashtra has increased markedly in recent years. In 1963, over 500 metric tons of the legs, worth nearly 3,200,000 rupees (about \$670,000), was exported to the United States, France, and other European countries. However, since price trends in the international market are downward, and since about 65 percent of the total weight of the frog is waste, a way to use the waste material would help meet some of the processing expenses. With this end in view, the heads and bodies (after the hind legs were removed) were converted to oil and meal, and the chemical, storage, and nutritive characteristics of these byproducts were examined. The yield of oil ranged from 6 to 8 percent of the total weight of the frogs, the nitrogen content ranged from 0.45 to 0.55 percent, and the unsaponifiable matter from 2.53 to 2.64 percent. Other characteristics are tabulated on the right. The oil changed very little during storage for 1 year when it was kept in sealed containers. The yield of meal ranged from 12 to 14 percent of the total weight of the frogs. The proximate chemical composition of meals prepared by wet reduction and

Property	Range
Color	Yellow to light brown
Specific gravity at 20/20	0.9107 to 0.9122
Saponification value	194.0 to 197.2
Iodine value (Hanus)	95.0 to 98.12
Acid value	0.47 to 1.13
Peroxide value	6.14 to 11.84

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Abstracter: L. Baldwin

6.10 of whole meal prepared from the heads by dry reduction was determined. (See below.)

Process and raw material	Chemical composition of the frog meals						Total volatile nitrogen mg.%
	Moisture	Proteins	Fat (dry basis)	Acid insol- ubles	Ash	Phosphorus (as P105 CaO)	
%	%	%	%	%	%	%	
Wet reduction of the entire waste	6.21	60.6	8.41	22.03	0.51	6.16	5.42
Dry reduction of the heads	7.27	56.2	12.61	18.49	2.79	4.67	3.45

Meal prepared by the dry reduction process has a higher fat content because much of the oil is removed by cooking and pressing during the wet reduction process. The press cake of the meals was dried at 80°, 110°, and 130° C., pulverized, and analyzed. The press cake that was dried at low temperature yielded a good quality meal; the fat component of the meal showed little evidence of oxidation. The values determined by fractionation of the proteins are tabulated, as are those that are associated with the nutritive value of the meals and the nature of the fat.

The percentage of proteins, fats, and minerals and the nutritive value of the frog meals are quite similar to those of fish meals; however, the α -amino nitrogen content, the available lysine and gross energy values, the pepsin digestibility percentage, and the range of values for the protein quality index are lower. The saponification value of the frog oil is within the range of that for fish oils, and the acid and peroxide values of the stored frog oils are similar to those of stored sardine oils; the iodine value of the frog oil, however, is less than that of fish oils. [5 tables, 11 references]

4.4

The rate of the reaction was much faster in the haddock. The data for haddock showed evidence for a rapid first-order reaction in which lecithin and phosphatidylethanolamine containing C₁₆:0, C₁₈:1, and C₂₀:5 acids were preferentially hydrolyzed. The phospholipid hydrolysis proceeded to an asymptote that decreased with lowering of temperature. Apparently the amount of free water available in the frozen state was important in the hydrolytic reactions. [1 figure, 4 tables, 27 references]

6.19 FISH MEAL FEEDSTUFF

Purpose.--Although the authors have evaluated the nutritive content of Peruvian anchovetta meal (Kifer et al., 1968), a separate evaluation of Chilean fish meal was clearly called for.

Action taken.--Sixteen samples of Chilean fish meal were collected at intervals from June 1967 to May 1968 from U.S. feed manufacturers. Half the samples were treated with either butylated hydroxy toluene or ethoxyquin, and the other half were left untreated. All the meals were analyzed chemically, and the resulting data were adjusted to provide a margin of safety equivalent to one-half standard deviation.

Results.--Five tables give the results of the chemical analyses of Chilean anchovetta meal:

Proximate composition and calcium and phosphorus content
Micro mineral content
Amino-acid composition as percent of protein and as percent of fish meal
Summary of nutrient composition data
The final table gives a mean comparison of the various nutrient contents of Peruvian and Chilean anchovetta meals. From this last table, it can be seen that the Chilean meal contains more protein, sodium, and lysine, and less extractable fat (whether treated with antioxidant or not), calcium, and phosphorus than the Peruvian meal contains. Except for the minerals just mentioned, the mineral spectra of the two meals are similar.
[6 tables, 4 references]

4.5 OXIDATION OF FISH LIPIDS BY OXYGEN
(3,2393)

6.192

to fish meal increased. Intakes of over 500 grams of urea with no added fish meal significantly lowered production. Rations U2 and U3 were consumed in excess of requirements for milk production, thus the feed to milk-conversion ratios of the cows fed these diets were higher than for those fed the U4 diet. In addition, their rate of live-weight gain was appreciable. The efficiency of feed to milk-protein conversion varied little among the cows fed the three rations, although the percentage of milk protein from those fed ration U4 was lower than that of the cows fed the other diets.

In summary, cows fed diet U2 ate more ration and crude protein; gave more milk, milk protein, and milk fat and a higher percentage of milk protein; and gained more weight than did the cows fed the other two diets. Cows fed U4 had the lowest values for all these variables. But they consumed more urea and a higher percentage of crude protein (nonprotein nitrogen), and they had a higher feed-protein to milk-protein ratio than did the cows fed the other two diets. [2 tables]

[Abstracter: F. T. Piskur]
A thin layer of ground raw fish is rapidly passed through a cooking zone heated with live steam. The fish are heated to 180° F. The cooked ground fish

Food Technology 23, No. 8, 48 (August 1969)
U.S. Dept. of the Interior
Gardiner, R. H. (pat.)
U.S. Patent 3,429,710

6.59 FISH MEAL FEEDSTUFF

Purpose.--Although the authors have evaluated the nutritive content of Peruvian anchovetta meal (Kifer et al., 1968), a separate evaluation of Chilean fish meal was clearly called for.

Action taken.--Sixteen samples of Chilean fish meal were collected at intervals from June 1967 to May 1968 from U.S. feed manufacturers. Half the samples were treated with either butylated hydroxy toluene or ethoxyquin, and the other half were left untreated. All the meals were analyzed chemically, and the resulting data were adjusted to provide a margin of safety equivalent to one-half standard deviation.

Results.--Five tables give the results of the chemical analyses of Chilean anchovetta meal:

Proximate composition and calcium and phosphorus content
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Amino-acid composition as percent of protein and as percent of fish meal
Summary of nutrient composition data
The final table gives a mean comparison of the various nutrient contents of Peruvian and Chilean anchovetta meals. From this last table, it can be seen that the Chilean meal contains more protein, sodium, and lysine, and less extractable fat (whether treated with antioxidant or not), calcium, and phosphorus than the Peruvian meal contains. Except for the minerals just mentioned, the mineral spectra of the two meals are similar.
[6 tables, 4 references]

4.64 FISHMEAL FEEDS
Food Technology 23, No. 8, 48 (August 1969)
Arakawa, S., S. Tomono, and T. Terase (pat.)
Chemical Abstracts 70, No. 7, 27739 (February 17, 1969)
U.S.S.R.)
Chizhev, G. B., and E. M. Rodin (Leningrad Tekhnol. Inst. Khim. Prom., Leningrad,
3,2393)

6.197 PHOSPHORUS SOURCES AND THEIR BIOLOGICAL VALUE IN FEEDS

Sullivan, T. W. (Department of Poultry Science, University of Nebraska, Lincoln)
Feedstuffs 41, No. 26, 28-29 (June 28, 1969)

Phosphorus is the most expensive and perhaps the most critical inorganic nutrient needed by poultry and livestock. Because of the role of dietary phosphate in bone development, its biological value is extremely important for young animals. Until the early 1940's, the primary sources of feed phosphate were steamed bonemeal, meat scraps, fish meal, and other animal byproducts; but with the outbreak of World War II, production and distribution of feeds from these sources were restricted. Feeds composed largely of grain and soybean meal were found to be deficient in phosphorus. The feed phosphate industry then stepped into the gap.

Today dicalcium phosphate (18.5 percent P) and defluorinated phosphate (18 percent P) account for about two-thirds of the feed phosphates used. But, since reports had shown that feed phosphorus sources vary in composition (both raw materials and processing methods affect the availability of phosphorus to animals), the biological value of feed phosphates was studied in bioassays of young turkeys, and a method was derived for computing a single biological value for each phosphorus source. The formula for the computation is as follows:

$$\text{Phosphorus biological value} = \frac{(\text{4-week body-weight gain in grams}/10)}{(\text{4-week gain:feed ratio})} + (\text{4-week percent bone ash}) + 10 \times \frac{(\text{4-week gain:feed ratio})}{(\text{over})}$$

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UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin
Nature 222, No. 5197, 983-984 (June 7, 1969)

6.38 ANTIMICROBIAL ACTIVITY OF SOME MARINE SPONGES (0.4)

Burkholder, Paul R. (Lamont Geological Observatory of Columbia University, Palisades, New York), and Klaus Ruetzler (Smithsonian Institution, Washington, D.C.)
Nature 222, No. 5197, 983-984 (June 7, 1969)

To develop new drugs, the authors studied the antimicrobial activity of marine sponges collected from the Caribbean Sea, the Mediterranean Sea, and the Great Barrier Reef. The sponges collected from the first two areas were either freeze-dried or dehydrated by gentle heating; some from the Caribbean were used fresh when their antimicrobial activity was compared with that of fresh specimens from the Pacific. The dried sponges were ground to a powder and moistened with citrate-phosphate buffer (pH 7.0) to form a slurry. Small portions of the slurry were placed on $\frac{1}{2}$ -in. filter paper disks and transferred to nutrient sea-water agar test plates seeded with marine bacteria. The plates were then incubated overnight at 32° C.

The activity of the Mediterranean sponges was tested against five microorganisms: Bacillus subtilis, Escherichia coli, Candida albicans, Mycobacterium phlei, and the marine bacterium B-746. Of the 31 species of sponges tested, 18 showed antimicrobial activity against 1 or more of the organisms. Marine 746 was the most susceptible to the sponges' growth inhibitors; C. albicans was the least. Verongia aerophoba, Grambe, Grambe sulfurea apparently contained (over)

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UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

6.39

LE REPEUPLEMENT DES CHAMPS DE LAMINARIA DIGITATA (L.) LAMOUROUX.
INFLUENCE COMPAREE DE LA COUPE ET DE L'ARRACHAGE
(REGROWTH OF BEDS OF LAMINARIA DIGITATA (L.) LAMOUROUX.
COMPARATIVE EFFECT OF CUTTING AND PULLING)

Perez, R. (Science et Pêche, Bull. Inst. Pêches marit., No. 181, 10 pp. (May 1969) (Institut Scientifique et Technique des Pêches Maritimes, 59, Avenue Raymond-Poincaré, Paris (16^e), France) (In French)

Preface.--Is it better to harvest seaweed by cutting or by pulling? In seeking an answer to the question, the author set two goals: to compare the effect of the two methods on regrowth of a harvested area, and to analyze the amount of time required for a rea harvested by each method to become exploitable again. In achieving the first goal, he periodically determined the mean dimensions (the length and diameter of the stipes and the length and width of the lamellae) of the plants that grew back following harvesting by each of the two methods, the composition of the laminaria in the two areas, and the density of growth in each of the areas; and he made general observations of conditions in each area. In achieving the second, he periodically compared the state of regrowth with the state of the laminaria in an exploitable area.

Findings.--Values obtained by measuring stipes and lamellae of 200 specimens show that the dimensions of laminaria in area A (where the plants were cut) were practically the same as those of laminaria in area B (where the plants were pulled). Histograms made during analysis of the laminaria composition of the two areas (over)

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Abstracter: L. Baldwin

7.599 POLYCHLOROBIPHENYLS (PCB'S) AND THEIR INTERFERENCE WITH PESTICIDE RESIDUE ANALYSIS (9.19)

Reynolds, Lincoln M. (Ontario Research Foundation, Sheridan Park, Ontario, Canada) Bulletin of Environmental Contamination and Toxicology 4, No. 3, 128-143 (May-June 1969)

Polychlorobiphenyls (PCB's) and related compounds are widely used--and are important--in industry, but not as pesticides. They are quite toxic, especially to liver cells. Conservationists have recently become interested in the PCB's because of a report by Jensen (1966) in Sweden of their presence in the tissue of wildlife. Contamination of the environment with PCB's can occur in three ways: (1) disposal of wastes containing these compounds into rivers and lakes, (2) burning of wastes containing these compounds, and (3) the use of pesticides to which PCB's have been added to extend the potency-life of the insecticides.

The PCB's are similar in structure and properties to the DDT pesticide group. In the analysis of pesticide residues, the PCB's, if present, will be carried through the usual pesticide extraction and screening procedures. And, because they possess electron absorbing properties, the PCB's will interfere with gas-liquid chromatographic electron capture analysis of the organochlorine compounds (pesticides). Jensen (1967) used a nitration procedure to differentiate the PCB's from the pesticide residues; however, the present researcher was not able to (over)

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Abstracter: F. T. Priskur

6.38

substances capable of inhibiting both gram-positive and gram-negative bacteria. *Ircinia oros* (O. Schm.), *Ircinia* (*Sarcotrigus*) *spinosa* (O. Schm.), *Gellius fibulatus* (O. Schm.), *Hymedesmia versicolor* Tops., *Suberites domuncula* (Olivi), *Ciona latus* (O. Schm.), *Tethya aurantium* (Pallas), *Erylus discolorporus* (O. Sch.), *Pavicidris* (O. Schm.), *Tethya* (*O. Schm.*), *Chondrilla nucula* (O. Schm.), *Leuconia solida* (*O. Schm.*), *Leucosolenia complicata* (Mont.), and *Clathrina blanca* (Mikl.-Maclay) were found to be nonantibiotic. Not all specimens of those species whose antibiotic activity was weak produced zones of inhibition.

Twenty sponges collected from the shallow water around Puerto Rico were tested against 11 marine bacteria isolated from such widely different areas as Woods Hole, Massachusetts; Sapo Island, Georgia; Puerto Rico; and the Orkney Islands. All were inhibited by extracts from 4 to 15 of the sponges, some of the bacteria being more susceptible than the others. *Verongia* spp. were among the most active of these sponges.

Fresh sponges collected from the Great Barrier Reef were compared with fresh specimens collected from the Caribbean. Although the species are different, their antimicrobial activity was quite similar, as shown in the table below.

Source of sponges	Number of samples of sponges	Sponges showing antimicrobial activity against		Percent
		Gram-positive bacteria	Gram-negative bacteria	
Caribbean	777	35	15	10
Great Barrier Reef	464	39	12	11

[3 tables, 3 references]

6.39

Relative phosphorus biological value = (biological value of unknown source) / (biological value of reference standard) $\times 100$

The biological values for six inorganic phosphorus sources are shown on the right. The author suggests that typical analyses provided by the supplier or the manufacturer should be used in formulating feeds. Only those sources that consistently have biological values of 66.0 and above should be used in feeds for starting turkeys, starting chicks, and starting pigs with the initial cost of day-old pouls and chicks and of young pigs dictated a precise. Moreover, the price per ton of a feed phosphorus source and the relative biological value of the source should be used to compute the cost per pound of available phosphorus; the relative biological values should be used in linear programming and in feed formulation by computer.

[4 figures, 4 tables, 4 references]

7.59

repeat the reaction successfully. The nitration procedure apparently is not suitable for mixtures of pesticides and PCB's because some pesticides and PCB's will not nitrate and some PCB's might nitrate.

The present author then tried separating the two groups analyzing each group separately. He tried eluting PCB's from a Florisil column with n-hexane. The author found that, with the exception of DDE, aldrin, and heptachlor, the PCB's and pesticides can be clearly separated by the use of a Florisil column. The PCB's were almost completely removed by elution with 200 ml. of hexane. DDE is eluted with the PCB's by hexane. This phenomenon can be used to advantage because the estimation of small amounts of DDT in the presence of interfering materials such as a PCB is enhanced if DDE is previously removed. The amount of DDT originally present can be estimated from the DDE produced by dehydrochlorination.

As a result of this study and in view of the fact that the presence of PCB's in wildlife tissues has not been positively confirmed by techniques other than chromatography, some of the peaks in earlier analyses may have been due to condensation products of the metabolites of pesticides such as DDT. The author suggests that more emphasis should be given to chemical modification of the pesticides and reinjection of the modified products into the gas chromatograph using retention times of the products as means of confirmation.

[2 figures, 2 tables, 11 references]

were superimposable, and curves of monthly density were likewise equivalent. General observations revealed that, although cutting does not destroy as many of the little plants as pulling does, it leaves stumps and cramps that rot and tend to hinder, possibly by the toxic substances that are exuded, for as long as 6 months the fixation, germination, and development of the young plants in the immediate vicinity. Although pulling removes many small laminaria, it also tears off sections of *Lithocamnum*, which covers many of the rocks upon which the laminaria need to grow; thus openings are made to the rocks, permitting the laminaria to fasten on a stable foundation and withstand the action of the waves better than they could if they were attached to the fragile *Lithocamnum* skin.

The role of glucono-delta-lactone as a fermentation product of the glucose carbohydrate is examined in the light of food regulations. A comprehensive review of the literature is contained.

[Abstracter: L. Baldwin]

Kotter, L., A. Paltzsch, and G. Geiger
Fleischwirtschaft **48**, 1333 (1968)
Food Manufacture **44**, No. 4, 46 (April 1969)

4.83

POLYETHER-POLYESTER ADDUCTS FOR COATING COMPOSITIONS

6.54

GLUCONO-DELTA-LACTONE IN SAUSAGES (3.9)

7.89 SCREENING OF FEED COMPONENTS FOR SALMONELLA
(2.05, 6.199) WITH POLYVALENT H AGGLUTINATION

Barkare, John A. (Central Research Laboratories, Ralston Purina Company, St. Louis, Missouri 63199)
Applied Microbiology 16, No. 12, 1872-1874 (December 1968)

The presence of salmonellae in feeds is frequently associated with the use of contaminated animal protein supplements. Current methods for detection and identification of Salmonellae organisms are cumbersome and lengthy--the conventional methods require 4 days. More rapid reliable methods are needed because analytical results are required before feed ingredients are distributed or used. The purpose of this study was to evaluate the application of the rapid screening method for the detection of Salmonellae organisms with polyvalent H antisera to feed components.

The samples tested came from a variety of sources and were selected to include variations in raw materials processed, methods of processing, levels of sanitization, and types of products. A total of 1,894 samples were tested with the polyvalent H method and the conventional method.

Salmonellae organisms were detected in 1,134 samples with the polyvalent H method and in 1,141 samples with the conventional method. Statistical analyses revealed that the polyvalent H method is as reliable as the conventional method. Salmonellae can be detected by the polyvalent H method in 60 hr. The author (over)

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9.13 ON BODY TEMPERATURES OF TUNAS AT THE TIME OF HAULAGE
(1.120)

Konagaya, Shiro (Tokai Reg. Fish. Res. Lab., Chuo-ku, Tokyo, Japan), Kazuoki Yamabe (Department of Fisheries, Nihon University, Tokyo, Japan), and Keishi Anano (Tokai Reg. Fish. Res. Lab.)
Bulletin of the Japanese Society of Scientific Fisheries 35, No. 4, 410-416 (April 1969)

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9.13 CRIAÇÃO DO SURURU MYTICELLA FALCATA (ORBIGNY, 1846)
(1.85) EM LABORATÓRIO
[RAISING MUSSELS MYTICELLA FALCATA (ORBIGNY, 1846)
IN THE LABORATORY]

Pereira-Barros, J. Bento (SUDENE), and Sílvio J. Macêdo (IOUTFP)
Boletim de Estudos de Pesca 2, No. 2, 31-42 (May-August 1967) (In Portuguese; English summary)

Problem.--The yield of mussel (Myticella falcata Orbigny) from the Mundau Lagoon fluctuates as the volume of water entering the lagoon through the Mundau River fluctuates. When the winter is fair, there is practically no off season in the fishery. But when floods are intense and the salinity of the water decreases, the mortality rate of the mussels rises sharply, and production declines by as much as 44 percent.

Solution.--As the first step toward finding possible means of controlling ecological conditions in the lagoon, the authors determined the maximum, minimum, and optimum levels of salinity that the mussels could tolerate. Using laboratory aquaria, they attempted to raise groups of mussels in waters whose salinity ranged in 1 % increments from 0 to 36 %. The mussels tested were of several length classes; the temperature and oxygen content of the water were maintained at levels ranging from 23.7° to 28.0° C. and from 4 to 5 ml./l., respectively, depending on the natural environment calculated at the end of 7 days. (over)

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9.13 MICROVOLT ELECTRIC SIGNALS FROM FISHES AND THE ENVIRONMENT
(1.120)

Barham, E. G., W. B. Huckabay, and R. Gowdy (Marine Environment Division, Naval Undersea Research and Development Center, San Diego, California 92132), and B. Burns
Science 164, No. 3882, 965-968 (May 23, 1969)

Members of nine fish families are known to generate strong electric pulses (ranging from 4 to 550 volts) for stunning prey, for defense, and possibly for communication. Other aquatic animals--for example, reptiles and brine shrimp--apparently produce none. In between these forms are fishes that produce weak signals. Minto and Hudson (1967) listed 130 of these fishes, belonging to 58 families. They reported that they had picked up species-specific signals with dipole antenna in aquarium tanks and even occasionally in the fishes' natural environment at a distance of several hundred meters.

Using equipment similar to that used by Minto and Hudson, the present authors recorded signals in the 0.01 to 40 μv. range from separate tanks containing albinos channel catfish (Ictalurus punctatus), black crappie (Pomoxis nigromaculatus), red-breast sunfish (Lepomis auritus), southern stingray (Dasyatis americana), and an amphibian (Siren lacertina). The signals were probably generated by the potentials from white-fiber-muscle action, since they correlated with the animals' rapid swimming movements or with their flight tremors. Sharp, spontaneous, pop-like signals having from two to three spikes were recorded from a tank containing (over)

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9.13 Abstracter: L. Baldwin
Abstracter: L. Baldwin

MORPHOCHEMICAL ANALYSIS OF MUCOUS CELLS
IN THE SKIN AND SLIME GLANDS OF HAGFISHES

Leppi, T. John (Sch. of Med., Univ. of New Mexico, Albuquerque
Chemical Abstracts 70, No. 9, 35410f (March 3, 1969))

9.13

Tilapia mossambica. The pops increased from 67 per minute at 6:30 p.m. to 200 per minute at 9 p.m. to 2,000 per minute by midnight, even though the tilapia's overt activity did not appear to change during this period.

Other experiments were run on tilapia, catfish, and northern anchovy (*Engraulis mordax*) in a reservoir, in live wells open to the bay, and in a lake. Click-and ricochet-type signals were recorded in all these aquatic environments (and in a backyard swimming pool). The ricochet-type signals increased markedly after sun-down. On the basis of these results, the authors conclude that the click-and ricochet-type signals are not biologically generated but are inherent in bodies of water--they come from earth currents, the atmosphere, the stratosphere, and outer space. Such signals are known to change with the time of day, the latitude, the inclination of the sun, the sun's activity, and various other factors.

Apparently their characteristics when received in water with a dipole antenna are so altered that even people familiar with atmospheric signals do not recognize them. Moreover, since they are similar in form and intensity to fish-generated signals, the two could be easily confused. These conclusions do not rule out the possibility of receiving, in natural environments, weak electric signals produced by fish, particularly signals from short ranges under optimum conditions.

The experiments conducted here demonstrate that some "nonelectric" fishes, and at least one amphibian, produce receivable electric signals. What role these signals play in the fishes' lives remains unanswered. Nevertheless, reception of the signals would seem to offer a valuable and as yet little-used tool in experiments on fish behavior, though practical applications in electromagnetically noisy natural environments may be unproductive.

[2 figures, 25 references]

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[2 figures, 25 references]

DETERMINATION OF DEGREE OF HEATING OF FISH MUSCLE
(6.132)

Doesburg, J. J., and Detdré Papendorf (Fishing Industry Research Institute, University of Cape Town, Rondebosch, South Africa)
Journal of Food Technology 4, No. 1, 17-26 (March 1969)

The purpose of the study was to develop a test to determine the degree of heating of fish in cookers used for manufacturing fish meal. The heating temperature range was 60° to 100° C.

A modified coagulation test was used in experiments on hake (a lean fish) and mackerel and pilchard (oily fishes).

In the temperature range of from 60° to 100° C., the maximum temperature (T_m) of a heat treatment could be calculated by use of the equation $T_m = 1.02(T_c - 0.2) \pm 2.0$. T_c = The coagulation temperature of the proteins of the filtrate obtained after extraction of the heated homogenate. For the oily fish, the equation $T_m = (T_c + 0.1) \pm 2.6$ could be used to calculate the maximum temperature in the range 60° to 80° C.; $T_m = 1.47(T_c - 37.0) + 3.9$ in the range from 80° to 100° C.

[1 figure, 3 tables, 19 references] [Abstracter: P. T. Piskur]

9.13

Salinity of water %	Mussel mortality %
0	51.7
1	60.0
2	20.0
3	5.0
4	0.0
..	..
15	0.0
16	16.0
25	5.0
33	0.0
35	13.4
36	5.8

Results.--The table on the left shows the main results. Conclusions.--From these results, the authors conclude that mussels can live in waters whose salinity ranges from 2% to 35%. Since the rate of mortality in waters having a salinity of 2% to 4% and from 16% to 35% was highest during the first few days, they also conclude that mussels are able to adapt, to a given extent, to changes in salinity. The optimum salinity was considered to range from 5% to 15%, since below 5% and above 15% there was some mortality during the first few days of each experiment.

[2 gaps, 2 tables, 8 references]

7.89

notes that the polyvalent H method detects only the presence (or absence) of salmonella--further identification of the isolates requires the use of specific somatic and flagellar antisera.
[2 tables, 10 references]

9.13

9.15 DESTRUCTION OF PACIFIC CORALS BY THE SEA STAR ACANTHASTER PLACCI

(1.0112) 9.19 PESTICIDES IN WATER.
PESTICIDE RESIDUES IN SEDIMENTS OF THE LOWER MISSISSIPPI RIVER
AND ITS TRIBUTARIES

Chester, Richard H. (University of Guam, Agana, Guam)
Science 165, No. 3890, 280-283 (July 18, 1969)

Problem.--The "crown-of-thorns starfish" (Acanthaster planci, Linnaeus) has been implicated in the destruction of large tracts of living coral off Borneo, New Guinea, the Fiji Islands, Truk, Palau, Yap, Rota, Sipan, Wake, Johnston Island, Midway, the east coast of Malaysia, Australia, and Guam. When the coral polyps is killed by the predacious starfish, the corallum is rapidly overgrown with algae, and most fish leave the area. Thus the destruction of the living coral reefs bodes economic disaster for the islands and atolls of Oceania, for most of the inhabitants derive a great part of their protein from reef fisheries. Moreover, loss of the living coral will lead to severe erosion of land that is normally protected from storm waves by a buffering line of reefs. The immediate problem, then, is to try to find the cause of the recent population explosion of A. placci and to devise some means of controlling it.

Action taken.--The severe infestation of the reefs off the U.S. Territory of Guam has led to establishment of a control program under the direction of the University of Guam. The first step has been collection of data on feeding rates, population movements, and stages of infestation along the coral reefs of Guam and Palau. These data include observations of the presence or absence of the starfish's natural enemies and of alterations in the natural environment caused by man-made disruptions. (over)

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Abstracter: L. Baldwin

9.19 RESIDUES IN FISH, WILDLIFE, AND ESTUARIES.
CHLORINATED HYDROCARBON PESTICIDES
IN CALIFORNIA BAYS AND ESTUARIES

Modin, John C. (California Department of Fish and Game, Marine Resources Operations, Menlo Park, California 94025)
Pesticides Monitoring Journal 2, No. 1, 1-7 (June 1969) (Pesticides Program, Food and Drug Administration, 1600 Clifton Road, N.E., Atlanta, Georgia 30333)

Program.--As part of a nationwide program to monitor organochlorine pesticide residues in estuaries, the U.S. Bureau of Commercial Fisheries in January 1966 contracted to the California Department of Fish and Game the responsibility to monitor selected estuaries in California for pesticides.

Findings.--Analyses of oysters, mussels, and clams sampled at points of interest within each estuary revealed DDT, DDD, DDE, dieldrin, and endrin in concentrations from 10 to 3,600 p.p.b. Calculations are based on the laboratory wet weight of homogenized tissue. In studies of offshore exposure, high levels of DDT, DDD, and DDE were found in a king crab (2,739 p.p.b.) and in ova from a king salmon (668 p.p.b.). Pesticides were also measured in the ova of prawn, flounder, halibut, and sole; of these, halibut ova were the most highly contaminated, with DDE, DDD, and DDT measuring 591 p.p.b. (over)

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Reprinted in part

Barthal, W. F. (Food and Drug Administration, Public Health Service, Department of Health, Education, and Welfare, Atlanta, Georgia 30333), J. C. Hawthorne, J. H. Ford (Plant Pest Control Division, U.S. Department of Agriculture, Report, Miss. 39501), G. C. Bolton, L. L. McDowell, E. H. Grissinger, and D. A. Parsons (Sedimentation Laboratory, Soil and Water Conservation Research Division, U.S. Department of Agriculture, Oxford, Miss. 38655)
Pesticides Monitoring Journal 2, No. 1, 8-66 (June 1969)

Purpose.--Studies of the chlorinated hydrocarbon content of sediments and water from the lower Mississippi River and its tributaries were conducted in 1964, 1966, and 1967 to determine the extent and possible sources of agricultural pesticides in the streams of the Delta.

Action.--The Mississippi River bed was sampled at 11 sites located between Tiptonville, Tenn., and New Orleans, La. Tributaries of the Mississippi in the Delta were sampled in Tennessee, Mississippi, Louisiana, and Arkansas.
Findings.--Pesticides residues were detected from both agricultural and non-agricultural sources; however, no evidence was found of a general buildup of chlorinated hydrocarbons in the sediments of these streams from farm use. Dieldrin, (over)

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Authors' abstract

9.19 SEWAGE TREATMENT: COMPLETE PROCESS

Anonymous
Chemical and Engineering News 47, No. 30, 8 (July 21, 1969)

Problem.--Two methods of treating municipal sewage are now used: a biological method and a recycling method. However, the first leaves sludge that nourishes algae in the rivers and lakes into which effluent is channeled, and the second is expensive.

Solution.--Matthew M. Zuckerman and Alan H. Molof, engineers at New York University, have proposed an economical, all-chemical process for treating sewage. The basic concept is rooted in their discovery that soluble organic materials in waste water fall into two distinct categories--those having a molecular weight of 1,200 or more (slightly more than half the materials are of this class) and those having a molecular weight of 400 or less (the rest fall here). The process involves converting the higher weight materials to the lower weight group and then removing all the organic materials, as well as the phosphorus and the nitrogen, by adsorption. It provides the full treatment now provided by primary (usually sedimentation), secondary (biological), and tertiary (for example, activated carbon) systems.

The Zuckerman-Molof process operates as follows: (1) Raw sewage, with 65 p.p.m. dissolved organic solids, goes through alkaline hydrolysis. This reaction. (over)

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Abstracter: L. Baldwin

SOME ECOLOGICAL BENEFITS OF WOODY PLANT CONTROL WITH HERBICIDES

Barrons, Keith C. (Agricultural Products Department, Dow Chemical Company, Midland, Michigan) Science 165, No. 3892, 465-468 (August 1, 1969)

The author's thesis is that the debate over selective herbicides must not be allowed to hamper their continued use in situations where they can benefit mankind; however, he recognizes that ecological effects as well as human benefits must be considered. Among the effects he mentions are those reported by Hardy in 1966: Tordon (4-amino-3,5,6 trichloropicolinic acid) herbicide at 1 p.p.m. in water had no adverse effect on Daphnia, algae, or small fish, nor did it build up in the tissues of these organisms; moreover, the fish that fed on the Daphnia that fed on the algae were not adversely affected. The growth of phytoplankton growing in water containing 1 p.p.m. 2,4-D (2,4-dichlorophenoxyacetic acid); 2,4,5-T (2,4,5-trichlorophenoxyacetic acid); or Tordon was inhibited little if at all by the herbicides (Butler, 1965).

aldrin, endrin, endrin keto, isodrin, chlordane, heptachlor, hexachloronorbornane, and heptachloroborneo were found in sediment and water samples collected from Cypress Creek and Wolf River at Memphis, Tenn., near a primary manufacturer of endrin and heptachlor. Lower concentrations of several of these compounds were detected in sediments collected from tributary streams in Mississippi near formulating plants that prepare the technical pesticides for agricultural use. DDT analogs and metabolites were found in some of the tributary streams where no known formulators are located.

TRACE METALS IN CANNED FOODS
(3.338)

Alimenta 7, 154 (1968)
Food Manufacture 44, No. 4, 42 (April 1969)

The principles of the atomic absorption method for analyzing trace metals in canned foods are briefly described. Standard curves showing the sensitivity of a commercial atomic absorption instrument to several metals under different burner and solvent conditions are given, and the interfering effect of other metals is discussed.

Results.--Waste water can be treated and drinking water produced in a single plant. Moreover, according to Professor Molof, construction of this plant will cost 40 percent less and operation 50 percent less than construction and operation of conventional plants.

FISHERY OCEANOGRAPHY 9.11 (1-30)

Favorite, Felix (Biological Laboratory, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, 2725 Montlake Boulevard East, Seattle, Washington 98102) *Commercial Fisheries Review* 31, No. 7, 32-34 (July 1969) (Separate No. 843)

This is the first of a series by Dr. Favorite who, for over a decade, has been in charge of an oceanographic program to define the ocean environment of the Pacific salmon (genus Oncorhynchus). The purpose of the series is to show how oceanographic research can aid in locating areas of profitable fishing and in solving problems of fishery research.

Future Program.--Plans are being made to investigate how current pesticide pollution in California estuaries affects important sport and commercial species. This information is essential to insure the protection of fisheries and wildlife resources from the chronic, sublethal pesticide levels prevailing in the marine environment.¹ figure 6 tables 7 references

13 Figures, 10 references]

Recommendations and conclusions.--Starfish infestations may be controlled by setting up topographical zones through which the animals cannot move; containing them within areas delimited by these zones will cause the populations to decline through starvation (they starve in about 6 months). Local extermination, destruction of infested areas, weekly inspection of areas in advance of the population movement, and monitoring of areas subject to blasting or dredging during larval settlement are suggested. However, the author says, if the population explosion of A. planci is due to a basic change in the animal's life history, control may not be possible. The inevitable result will be extinction of madreporellan corals in the Pacific.

Pesticide residues in estuaries geographically isolated from agricultural areas seldom exceeded 100 p.p.b. Pesticide residues frequently exceeded this level in agricultural regions and were found as high as 11,000 p.p.b. in shellfish from polluted areas.

Studies revealed 430 p.p.b. DDE in the ova of Dungeness crab taken in the San Francisco area. This level decreased to 54 p.p.b. in samples collected 43 miles north of San Francisco.

9.4 MARINE SCIENCE AFFAIRS--A YEAR OF BROADENED PARTICIPATION
THE THIRD REPORT OF THE PRESIDENT TO THE CONGRESS
ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT

Anonymous
Marine Science Affairs--A Year of Broadened Participation, 251 pp. (January 1969)
For sale by the Superintendent of Documents, U.S. Government Printing Office,
Washington, D.C. 20402. Price \$1.25

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INTRODUCTION

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- III. EXPANDING INTERNATIONAL COOPERATION AND UNDERSTANDING (developing legal bases for international and regional control, improving cooperative arrangements)
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(over)
COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

9.6 SOME RECENT PUBLICATIONS

- Anonymous
FAO Fish Culture Bulletin 1, No. 3, 24-25 (April 1969) (Fishery Resources and Exploitation Division, Department of Fisheries, Food and Agriculture Organization of the United Nations, Rome, Italy)
- The publications cited, and in some instances briefly described, here deal with (1) fish culture in general, (2) the farming of specific kinds of fish, and (3) the farming of crustaceans and mollusks. [The bracketed number preceding a publication is the QFA cross reference.]

- (1) General Fish Culture
[9.16] "The Farming of Fish," by C. F. Hickling. Pergamon Press Ltd., Headington Hill Hall, Oxford, 4-5 Fitzroy Square, London, W.1., England.
vii + 88 pp. (1968) Price 21s.
- [9.19] "A Preliminary Bibliography on the Utilization of Sewage in Fish Culture," by George H. Allen. FAO Fisheries Circular No. 308. 15 pp. (1969)
"Some Basic Concepts on Fish Culture," by G. A. Prowse. IPFC Occasional Paper 69/2. 12 pp. (1969)
"The Role of FAO in the Development of Inland Fishery Resources," by Department of Fisheries. FAO Fisheries Technical Paper No. 81. 6 pp. (1968)

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 19
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Abstracter: L. Baldwin

9.6 JOURNAL OF TEXTURE STUDIES

(0.6)

Anonymous

Journal of Texture Studies brochure, 4 pp. (n.d.) (D. Reidel Publishing Company, P.O. Box 17, Dordrecht, Holland)

The textural attributes of foods and pharmaceuticals have a direct bearing on their appeal to the consumer. Until not so very long ago empirical tests were mainly used to assess these attributes, and such tests were adequate for quality control purposes. However, in recent years consumer requirements have become more sophisticated thus necessitating more detailed and meaningful investigations of textural attributes and the factors which influence them. Such investigations involve many disciplines e.g. food science and technology, pharmaceutical chemistry and technology, rheology, surface and colloid science, oils and fats chemistry, psychophysics, mechanics of mastication, etc.

The aim and purpose of this journal is to publish original work from all those disciplines which have some relevance to the texture and consistency of foods, pharmaceuticals, and allied products. For the first time the reader will be presented with current textural studies within the pages of a single journal.

Subjects covered will be instrumental and other methods of measurement, sensory assessment by specialized panels and consumer panels, psychobiology of sensory perception, panel training and scoring procedures, correlation of instrumental and sensory assessments, and discussions on the shearing forces operative during product usage by the consumer.

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 19
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Reprinted in part

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In addition to original research contributions we intend to publish review papers, letters to the editor, research notes, abstracts, and book reviews. All submitted manuscripts will be assured of speedy publication subject to the approval of the nominated referees. No page charges will be levied on the contributors or their institutions. Each author will receive 25 reprints free. Additional reprints may be purchased. It is hoped that this journal will become the central forum for all matters relating to texture and consistency.

The first issue is scheduled for publication Fall 1969.

The cost of postage per volume of 4 issues (ca. 500 pages) Dfl. 160.- (US\$45.-). The cost of postage is not included. Initially the journal will be published quarterly. Private persons (no institutions, laboratories, libraries, etc.) may subscribe at the regular price of Dfl. 50.- (US\$14.-) per volume. The cost of postage is not included. They should declare that the subscription is for their own personal use, that it will not replace any existing library subscription and will not be put at the disposal of any library. Subscriptions should be sent to D. Riedel Publishing Company, P.O. Box 17, Dordrecht, Holland, or to any subscription agent.

Subscriptions should be sent to D. Riedel Publishing Company, P.O. Box 17,

Gerking, Shelby D. (ed.)
The Biological Basis for Freshwater Fish Production, 495 pp. (Wiley: New York [1967])
Chemical Abstracts 70, No. 9, 35503P (March 3, 1969)

THE BIOLOGICAL BASIS FOR FRESHWATER FISH PRODUCTION

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- VI. ACCELERATING USE OF FOOD FROM THE SEA (status of U.S. fishing industry, revitalizing the industry; food from the sea to combat hunger)
- VII. ENCOURAGING DEVELOPMENT OF NON-LIVING RESOURCES (Federal, state, and private development of off-shore mineral resources)
- VIII. FACILITATING TRANSPORT AND TRADE (improving the merchant fleet, ship channels, harbors, ports, navigation aids; reducing pollution)
- IX. LAUNCHING AN INTERNATIONAL DECADE OF OCEAN EXPLORATION (goals and types of program, both national and international, required)
- X. ADVANCING THE SEA GRANT PROGRAM (policies and guidelines for implementing the National Sea Grant College and Program Act, status of the program)
- XI. FORMULATING ARCTIC POLICIES AND PROGRAMS (developing a policy, expanding research capabilities, stating the scientific goals of an Arctic program)
- XII. UNDERSTANDING AND SURVEYING THE OCEAN ENVIRONMENT (mapping, charting, geodesy, ocean observation and prediction, buoy technology, spacecraft oceanography)
- XIII. INFORMATION MANAGEMENT (collecting, processing, and distributing marine environmental data; analyzing user needs and means of supplying them)
- XIV. RESEARCH, MANPOWER, AND ENGINEERING (recent advances in marine engineering and technology; manpower training and education; Federal research funding)
- XV. NATIONAL POLICY PLANNING AND COORDINATION (the function of the National Council on Marine Resources and Engineering Development in developing a national effort, communicating with non-Federal agencies, and serving as a national advocate for marine sciences)
- XVI. LOOKING AHEAD (what we must do to take advantage of existing opportunities) [44 figures, 29 tables, 3 appendices]

9.6

The reviewer concludes by stating that phycologists will need the book because it provides an introduction to the literature of certain aspects of phycoLOGY not normally available to the specialist; it places phycoLOGY on a global stage, thereby helping the investigator orient himself. However, the reviewer adds, the nonspecialist who expects to learn very much about algae, man, or the environment will surely be confused.

[Abstracter: L. Baldwin]
Reviewed by Robert Clarke
Nature 222, No. 5195, 799-800 (May 24, 1969)

The first volume of this facsimile reprint, first published in 1820, is a pioneer work on oceanography that, because of its precision, detail, and scope, should be of interest to biologists, oceanographers, geographers, glaciologists, meteorologists, students of navigation, naval architects, economists, and social and legal historians. The second volume, according to the reviewer, is a classic print giving an account of the life and achievements of the sailor-explorer-scientist-theologian author.

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- [9.17] "Scientific Basis for the Conservation of Non-oceanic Living Aquatic Resources," by William A. Dill and T. V. Pillay. FAO Fisheries Technical Paper No. 82. 15 pp. (1968).
- [1.0156] "Report to the Government of the Syrian Arab Republic on Fish Culture Project and Related Fields," based on work of D. R. Riedel. FAO Fish. UNDP(TA) Rep. No. 2445. 36 pp. (n.d.)
- [1.0162] "Report to the Government of Uganda on Fish Culture Development," based on work of K. M. Apostolski. FAO/UNDP(TA) Report No. 2575. vi + 11 pp.
- (2) Farming Specific Fish [1.92], "Synopsis of Biological Data on Catla, *Catla catla* (Hamilton, 1822)," by V. G. Jhingran. FAO Fisheries Synopsis No. 32, Rev. 1. var. pp. (1968)
- [1.92], "An Annotated Bibliography of Tilapia (Pisces, Cichlidae)," by D. F. E. Thys van den Audenaerde. Tervuren, Belgique, Musée royal de l'Afrique centrale. Documentation Zoologique, No. 14. 406 pp. (1968)
- [1.92] "A Preliminary Bibliography of the Grass Carp, *Ctenopharyngodon idellus* Valenciennes," by K. Nair. FAO Fisheries Circular No. 302. 15 pp. (1968)
- (3) Farming Crustaceans and Mollusks [1.85] "A Brief Working Bibliography on Shrimp Culture With Particular Reference to *Macrobrachium* spp." by S. W. Ling, compiler. IPFC Occasional Paper 68/1. 4 pp. (1968)
- [1.88] "Mollusc Culture: A Review of Raft Culture," by E. Edwards. Dublin, Irish Sea Fisheries Board. 7 pp. (1968)
- [1.85] "Proceedings of the World Scientific Conference on the Biology and Culture of Shrimps and Prawns, Mexico City, Mexico, 12-21 June 1967," FAO Fisheries Reports (57), Vol. 1, 75 pp.; Vol. 2, 411-458 pp. (n.d.)

0.32 ESR STUDIES OF COPPER(II) COMPLEX IONS

Crawford, Thomas H., and Jerry O. Dalton (Department of Chemistry, University of Louisville, Louisville, Kentucky 40208) Archives of Biochemistry and Biophysics 131, No. 1, 123-138 (April 1969)

A number of different techniques are currently being used to study the interaction of copper(II) ions with various amino acids, peptides, and proteins. In the present study, the authors report the changes in a bonding parameter, a^2 , for several copper(II)-peptide complexes as determined by ESR (electron spin resonance) measurements over a limited range of pH. The bonding parameter a^2 was evaluated at liquid-nitrogen temperatures. The changes in the nature of the metal to ligand bonding are reflected in the changing values of a^2 as the pH is varied.

The authors found a reasonable correlation between the structures proposed in the literature as determined by spectrophotometric and potentiometric methods and the values of a^2 as determined by ESR measurements. They particularly note the apparent change in the nature of the bonding in the trypsin-copper(II) complex over the range of pH 5 to pH 6, suggesting that primarily amine-amide oxygen bonding sites are rearranged to amine-amide nitrogen-bonding sites. They further note no detectable change in ESR parameters on exposure of trypsin-copper(II) samples to magnetic fields of approximately 14,100 G.

[Abstracter: F. T. Piskur]

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0.36 DDT UPTAKE AND METABOLISM BY A MARINE DIATOM

Keil, Julian E. (Preventive Medicine Section, Medical College of South Carolina, Charleston, South Carolina), and Lamar E. Priester (Chemistry Department, Medical College of South Carolina, Charleston) Bulletin of Environmental Contamination and Toxicology 4, No. 3, 169-173 (May-June 1969)

Keil (1965) found that shrimp in aquaria were sensitive to small amounts of certain insecticides, but shrimp in a natural environment were not affected when similar levels of insecticide were applied to that environment. This reaction indicated the possible presence of "detoxifiers" in the environment. Microorganisms in the water might serve as detoxifiers, since they (especially the diatoms) store food as oil and leucosin rather than starch and might "pick up" the oil-soluble pesticides.

The authors found that the diatom Cylindrotheca closterium, Reimann and Lewin, was capable of absorbing and concentrating DDT above the level of the DDT in sea water. The DDT was metabolized by the organism only to DDE.

[Abstracter: F. T. Piskur]

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0.35 THE MECHANISM OF MUSCULAR CONTRACTION

Huxley, H. E. (Medical Research Council Laboratory of Molecular Biology, Hills Road, Cambridge, England) Science 164, No. 3886, 1356-1366 (June 20, 1969)

The article discusses new findings about the contraction process in striated muscle and the implications of these findings.

Striated muscle contracts by means of some mechanism that generates a relative sliding force between the partly overlapping arrays of actin and myosin filaments. Seemingly, the cross-bridges that project from the myosin filaments and carry the adenosine triphosphatase and actin binding sites are involved in generating the sliding force. The actual force-generating structure is attached to the "backbone" of the myosin filaments by a linkage 400 Å long and having flexible couplings at each end. This structure, then, can attach itself to the actin filament in a constant configuration and undergo structural changes and produce longitudinal forces that are exactly the same over a wide range of interfilament separations. Since the muscle structure is so arranged that the linkage is under tension rather than compression when a contractile force is generated, the force can be transmitted without difficulty. The characteristic feature of the contraction mechanism may be a rigid attachment of the globular "head" of the myosin molecule to the actin filament and an active change in the angle of attachment during the splitting of adenosine triphosphate.

[Abstracter: L. Baldwin]

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1.0145 OKEANOLOGII

Plunkett, Robert D., Oceans 2, No. 1, 48-57 (July 1969) (P.O. Box 1820, La Jolla, California 92037)

This report briefly discusses Soviet development in oceanography relative to organization, manpower, and training; construction and assignment of vessels; and instrumentation, operations, and research. The author states that the Soviet organization serves the nation's national interest exclusively and that all effort is governmental regardless of the apparent basis for its existence.

Oceanographic studies in the Soviet Union apparently are centered in three organizational entities of the government: (1) The U.S.S.R. State Committee for the Coordination of Scientific Research, which has control over the functions of the Academies of Science and the Ministry of Higher and Specialized Secondary Education; (2) the main administration of the Hydrometeorological Service, with its institutes, observational networks, instrument manufacturing plants, and other related facilities; and (3) the U.S.S.R. Committee for Fish Economy, which controls the All-Union Scientific Research Institute of Marine Fisheries and Oceanography and its subordinate branches. Two other organizational units also have oceanographic functions: The Ministry of Defense, with its all-ocean Hydrographic Service, and (2) the Ministry of Geology and Mineral Resources, which controls the marine branch of the All-Union Institute of Geophysical Methods of Prospecting.

[Abstracter: F. T. Piskur]
[1 organizational flow chart; 4 illustrations]

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0.35 PHYSICS AND BIOLOGY: CLOSING THE GAP
(0.4)

Bernhard, Robert
Scientific Research 4, No. 13, 17-20 (June 23, 1969). (McGraw-Hill Inc., McGraw-Hill Building, 330 W. 42nd Street, New York, N.Y. 10036)

The gap between physics and biology is nowhere more evident than in considerations of how the manifold biochemical events in the cell are timed and coordinated properly--the physicochemical laws applied in biology deal only with the thermodynamic aspects of molecular structure and function or with the kinetics of isolated biochemical reactions. Now a theoretical biologist at the University of Sussex (Palmer, Brighton, England) is evolving a model that may eventually provide biology with the same kind of unifying laws that physics now has. Although his theory is still tentative, he has discovered a new quantity, the "talandic" temperature, that for the first time permits the merger of thermodynamics with parameters of cell organization. Talandic temperature is an observable quantity that indicates how energy will be distributed among the interacting, feedback control systems that regulate the activity of genes and the synthesis of messenger RNA (ribonucleic acid) and proteins. The basic concept is that the cell is a resonating system made up of coupled oscillators; the talandic temperature, then, is a measure of the cell's tendency to shift spontaneously between various resonant modes--oscillator energy flows from one oscillator to another in the direction of the negative gradient of the talandic temperature. The article describes the steps by which this concept was derived.
[1 figure]

[Abstracter: L. Baldwin]

2.05 SALMONELLA REPORT INCLUDES SUGGESTIONS DEALING WITH FEED
(6.55, 9.3)

Anonymous
Feedstuffs 41, No. 28, 1, 4 (July 12, 1969)

"An Evaluation of the Salmonella Problem," the report of a special committee of the National Research Council (made under contract with the Food and Drug Administration and the U.S. Department of Agriculture), is now available. The report includes recommendations affecting both the feed industry and the animal-agriculture industry. Among those affecting the feed industry are the following. Federal and state agencies should develop and implement programs designed to control salmonella contamination of feeds and feed ingredients. Regulations should define inspection responsibilities and interagency relations. Such considerations as terminal pasteurization of animal byproducts, protection of animal feeds from animal-borne recontamination, design of plants to improve control of air-borne contamination and cross-contamination of feeds during manufacture should be treated as of most importance. Clean, sanitized carriers should be provided, and common transportation with other products in trucks, railroad cars, and other common carriers should be prevented.

Copies of the full report are available for \$6 per copy from the Printing and Publishing Office, National Research Council, 2101 Constitution Avenue N.W., Washington, D.C. 20418. Single copies of the recommendations only are available from the Press Service, U.S. Department of Agriculture, Washington, D.C. 20250, or from the Press Relations Staff (CE 300), Office of Education and Information, Food and Drug Administration, Department of Health, Education and Welfare, Washington, D.C. 20204.
[Abstracter: L. Baldwin]

0.321 SPIN-LABELED HEMOGLOBIN DERIVATIVES IN SOLUTION,
POLYCRYSTALLINE SUSPENSIONS, AND SINGLE CRYSTALS

McConnell, H. M., W. Deal, and R. T. Ogata (Stauffer Laboratory for Physical Chemistry, Stanford, California 94305)
Biochemistry 8, No. 6, 2580-2585 (June 1969)

The results of a comparative study of the paramagnetic resonance of the carbon monoxyl, met, met azide, and met fluoride derivatives of spin-labeled horse hemoglobin in solution, in polycrystalline suspensions, and in single crystals are presented. The authors undertook the study for two reasons: (1) to compare the resonance spectra of hemoglobin in solution and in single crystals so they could probe the conformational differences in these two states, since such spin-label spectra depend on the local protein conformation in the vicinity of the label; and (2) to interpret the paramagnetic resonance spectra of carbonmonoxy or oxyhemoglobin in solution, since the low-field hyperfine component in each is split into two signals of comparable intensity and since splitting of this type has never been seen for labels dissolved in solutions of varying viscosity. The solution to these problems is important in use of spin-label technique for studying the heme-heme interaction.
[7 figures, 15 references]

[Abstracter: L. Baldwin]

Chemical Abstracts 70, No. 9, 3570c (March 3, 1969)
Publ. by American Chemical Society, Washington, D.C. 20452

ATTENTION TO ESTIMATE THE TYPE OF METABOLIC HYDROLYZATE
BY CONJUGATION AND DECONJUGATION OF ACTIN

0.35 PHYSICS AND BIOLOGY: CLOSING THE GAP
(0.4)

2.05 SALMONELLA REPORT INCLUDES SUGGESTIONS DEALING WITH FEED
(6.55, 9.3)

Anonymous
Feedstuffs 41, No. 28, 1, 4 (July 12, 1969)

"An Evaluation of the Salmonella Problem," the report of a special committee of the National Research Council (made under contract with the Food and Drug Administration and the U.S. Department of Agriculture), is now available. The report includes recommendations affecting both the feed industry and the animal-agriculture industry. Among those affecting the feed industry are the following. Federal and state agencies should develop and implement programs designed to control salmonella contamination of feeds and feed ingredients. Regulations should define inspection responsibilities and interagency relations. Such considerations as terminal pasteurization of animal byproducts, protection of animal feeds from animal-borne recontamination, design of plants to improve control of air-borne contamination and cross-contamination of feeds during manufacture should be treated as of most importance. Clean, sanitized carriers should be provided, and common transportation with other products in trucks, railroad cars, and other common carriers should be prevented.

Copies of the full report are available for \$6 per copy from the Printing and Publishing Office, National Research Council, 2101 Constitution Avenue N.W., Washington, D.C. 20418. Single copies of the recommendations only are available from the Press Service, U.S. Department of Agriculture, Washington, D.C. 20250, or from the Press Relations Staff (CE 300), Office of Education and Information, Food and Drug Administration, Department of Health, Education and Welfare, Washington, D.C. 20204.
[Abstracter: L. Baldwin]

0.36 THE EFFECTS OF TEMPERATURE ON THE SUSCEPTIBILITY OF BLUEGILLS
(9.13, 9.19)
AND RAINBOW TROUT TO SELECTED PESTICIDES
Macek, Kenneth J., Curt Hutchinson, and Oliver B. Cope (Fish-Pesticide Laboratory, U.S. Bureau of Sport Fisheries and Wildlife, Columbia, Missouri)
Bulletin of Environmental Contamination and Toxicology 4, No. 3, 174-183 (May-June 1969)

Bridges (1965), Mahdi (1966), and Walker (1963) have suggested that temperature can have a marked effect on the susceptibility of fish to pesticides. The interaction of environmental factors, such as temperature, must be considered in the evaluation of possible hazards of pesticides to fish. The present report presents the results of a 5-year study of the effects of temperature on the susceptibility of rainbow trout (*Salmo gairdneri* Richardson) and bluegills (*Lepomis macrochirus* Rafinesque) to 15 commercially available pesticides.

The authors found, generally, an increase in the susceptibility of fish to most pesticides as temperature increases. This temperature-related reaction of fish to pesticides is not completely understood. Nevertheless, the general effect of temperature is clear, and the authors emphasize the need for considering the interaction between pesticides and environmental factors when determining safe levels of such compounds in aquatic habitats.
[3 tables, 7 references]

[Abstracter: F. T. Piskur]

0.36

3.2349 DEHYDRATION PROCESS
(3.63)

U.S. Patent 3,438,792
Kruger, H. W. (pat.)
Lamb-Weston, Inc.
Food Technology 23, No. 8, 48 (August 1969)

Frozen pieces of foodstuff are first freeze-dried for 30 to 60 min. to produce a porous surface layer. The pieces are then air dried for 1 to 3 hr.

Then the discussed batch-type or conventional meat-smoking operation, involving ovens and ovens, [Abstracter: L. Baldwin]

lasting about 1 hr during the discussion, [Abstracter: L. Baldwin]

involving ovens and ovens; the time schedules for cooking, and ways of preparing, will be used for some time to come. The maintenance of the smokehouse, [Abstracter: L. Baldwin]

meat smokers built by the entire meat-smoking operation.

Then only by smokehouses built by the smokeless meat-smoking operation, [Abstracter: L. Baldwin]

which, he says to come, The meat industry supply and equipment manufacturers, [Abstracter: L. Baldwin]

will be used for some time to come. The meat industry supply and equipment manufacturers, [Abstracter: L. Baldwin]

3.336 REVERSED ROTATION STERILISATION OF CANNED MEATS

Christiansen, K.
Fleischwirtschaft 48, 1149-1184 (1968)
Food Manufacture 44, No. 4, 46 (April 1969)

This paper gives the results of experiments in the use of the reversed rotating method for sterilizing canned meats and mentions the advantages of rotating airtight containers during the sterilization process. It describes the technology of reversed rotation and compares this method with other procedures. A combination of reversed rotation and the high-temperature, short-time method is shown to reduce heating time more than either method used singly; quality is unimpaired, yet spores are inactivated. [66 references] [Abstracter: L. Baldwin]

3.2349 LOBSTER PACKAGE
(3.2383, 1.87)

British Patent 1,140,660
A. R. Clouston and Sons Ltd. (pat.)
Food Technology 23, No. 8, 48 (August 1969)

A whole lobster is frozen in a rigid cylindrical container. The container is made of foamed plastic formed in two semicylindrical halves.

[Abstracter: P. T. Pliskur]

To form a partially frozen strip, the strip is scored part after the product is frozen. [Abstracter: P. T. Pliskur]

Loose broken food particles on a conveyor are sprayed with freezing brine needs to permit it to be broken apart after the product is frozen. [Abstracter: P. T. Pliskur]

Food Technology 23, No. 8, 48 (August 1969)

The lobster is partially frozen to a cold (-5° C.) surface for further processing.

Food Technology 23, No. 8, 38 (August 1969)

Polymerized styrene, potassium persulfate (pat.)

German Patent Bureau, Appl. 1,429,907, 0,12)

3.2344 FISH PROCESSING

3.2382 PACKAGING
(4.29)

Frab, W., and K. Bernhart
Deut. Lebensm.-Rundschau 64, 33 (1968)
Food Manufacture 44, No. 5, 94 (May 1969)

Plasticizers and oligomers were extracted with ether and n-pentane from various polystyrene plastic containers to show the amounts of contaminants possibly transferred from the containers into edible fats and oils. Currently used additives--particularly paraffin oils, butyl stearate, dibutyl phthalate, octadecyl alcohol, and di-isomylo adipate--were tested. Ether and n-pentane gave rather high values; only negligible concentrations of plasticizers and lubricants appeared in coconut fat stored at 40° C. for 2 weeks in contact with polystyrene. [Abstracter: L. Baldwin]

Abstracter: L. Baldwin

Abstracter: L. Baldwin

A Strangegger (West Germany) firm has developed a machine that can stack sandwiches tightly and neatly into cans. The machine has a mechanical feeder equipped with a double conveyor system that is synchronized to ensure uninterrupted feeding of the feeders, which a head-center and bottom machine and a top machine.

A Strangegger (West Germany) firm has developed a machine that can stack sandwiches tightly and neatly into cans. The machine has a mechanical feeder equipped

with a double conveyor system that is synchronized to ensure uninterrupted feeding of the feeders, which a head-center and bottom machine and a top machine.

Abstracter: L. Baldwin

3.332 LEAVING OF PLASTICISERS BY FAT

Anonymous
Norwegian Fishing and Maritime News 16, No. 1, 39 (1969)

FIRST MACHINE TO STACK SARDINES INTO THE CAN

Food Manufacture 44, No. 4, 48 (April 1969)

Graeb, M., and K. Bernhart
Deut. Lebensm.-Rundschau 64, 33 (1968)

Rather high values appeared in the results of tests in which ether and n-pentane were used to extract plasticizers and oligomers from polystyrenes and polyesters. Plasticizers and oligomers from polystyrenes and polyesters appeared in the amount of consumers possibly transferred into adipic acid cases, diethyl stearate, dibutyl phthalate, octadecyl alcohol, and di-isomylo

benzoates appeared in the ether, diethyl stearate, and di-isomylo

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benzoates appeared in the ether, diethyl stearate, and di-isomylo

6.54 DRIED MEAT PRODUCT AND METHOD OF MAKING SAME

(3.63)

U.S. Patent 3,432,411
Gruner, Ernst Otto (pat.)National Provisioner 160, No. 26, 29 (June 28, 1969)

Beef, pork, fowl, and fish, alone or as a mixture, are divided into two parts --the major part consists of chunks and the minor part of comminuted meat. Each part is mixed with preservative sodium chloride and, if the meat is to be cured, with a curing salt. The two parts are mixed, put into a mold, and frozen; then the cold meat is softened by slight warming, sliced thin, and heated to at least 160° P. to bind the parts together. Finally, the slices are cooled and dehydrated.

[Abstracter: L. Baldwin]

Sausage material that has been formed into a cylinder shape is moved by an endless belt first through a tubular-shaped heating structure, where the sausage material is partially cooked, and then through a cooling structure.

U.S. Patent 4,421,434
Krachmer, Robert C. (pat.)
Geo. A. Hormel & Co. (Austin, Minnesota)
National Provisioner 160, No. 26, 28 (June 28, 1969)

ESTUDOS SÔBRE A PESCA NA ZONA LITORÂNEA DOS ESTADOS DO RIO GRANDE DO NORTE E PARAÍBA [STUDIES OF THE INSHORE FISHERY IN THE STATES OF RIO GRANDE DO NORTE AND PARAÍBA]

9.2 (1.013)

DOS ESTADOS DO RIO GRANDE DO NORTE E PARAÍBA
[STUDIES OF THE INSHORE FISHERY IN THE STATES
OF RIO GRANDE DO NORTE AND PARAÍBA]

Ferreira, Marcílio Vieira, Silvio Barbosa de Moraes, and Flávio Rodrigues Lima

(SUDENE)

Boletim de Estudos de Pesca 2, No. 3, 27-59 + 8 appendix pp. (September-December 1967) (In Portuguese; English summary)

Purpose.--This study had a twofold purpose: to supplement previous studies of the general conditions of the operating fisheries in two cities in Paraíba and five cities in Rio Grande do Norte, and to appraise fishery resources in these two states so that a new investment policy could be formulated for the region.

Action.--Regional conditions (electric power supplies, roads and railroads, transportation and communication facilities, docks and anchorages, shipyards, fuel supplies, workshops, refrigeration facilities), the fisheries situation (number of fishermen, type and number of vessels, kinds of gear used and their effectiveness, fish caught, preservation and marketing of the catch), and the socio-economic conditions of the practicing fishermen were surveyed. Using the research vessel "Serra Azul," exploratory fishing was conducted in the areas fished from the survey region. [7 figures, 10 tables]

6.54 APPARATUS FOR FORMING SAUSAGE

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 25
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

7.51 THE DETERMINATION OF PROTEIN IN BIOLOGICAL MATERIALS AND FOODSTUFFS

7.51

9.6 (6.190)

LIQUID SUPPLEMENTS FOR LIVESTOCK FEEDING

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 25
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

Gorsuch, T. T. (Ranks Hovis McDougall Ltd., Millocrat House, 53 Eastcheap, London, E.C.3, England), and R. L. Norton, Journal of Food Technology 4, No. 1, 1-6 (March 1969)

Journal of Food Technology, Vol. 4, No. 1, 1-6 (March 1969)

The determination of protein in materials containing variable amounts of non-protein nitrogen often gives anomalous results. The present report gives results of a study of three methods for determining protein--the Folin, dye-binding, and ninhydrin procedures--as applied to mycelial systems, flour, and dried eggs. The authors found that all three methods gave different results when different proteins were used, indicating that the values obtained from the same materials under different conditions were not always comparable. To obtain a more reliable result, the authors suggest that the three methods be prepared under identical conditions. [Abstracter: P. T. Piskur]

7.51 EVALUATION OF JELLED MEATS

7.51 (3.336)

Bartels, H., and R. Hadlok
Fleischwirtschaft 48, 1613 (1968)
Food Manufacture 44, No. 4, 46 (April 1969)

A literature survey confirms that jellied meats of medium quality do not contain more than 50 percent jelly; the analytical examination of jellied meats during the manufacturing process is discussed.

[Abstracter: L. Baldwin]

This is an expansion of Technical Data Report No. 6, entitled "Liquid Supplements," published earlier. It is of use to manufacturers and users of liquid supplements (including fish solubles). The 25 major sections of the book include species descriptions, problems with liquid supplements, advantages of liquid supplements, problems with solid feeds, ration formulation, hydrolyzed proteins, amino acid nitrogen and stability, additives, preservatives, vitamins, addition and stability, feeders, trial data, quantity, and price.

7.51 COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 25
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

9.19

RADIOACTIVE WASTE CONTROL AT THE UNITED KINGDOM ATOMIC RESEARCH ESTABLISHMENT, HARWELL

6.19

Burns, Ronald H., G. W. Clare, and Joseph H. Clarke (Chem. Eng. Div., At. Energy Res. Estab., Harwell, England)

Chemical Abstracts 70, No. 12, 9, 0314w (March 24, 1969)COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 11 PAGE 25
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

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